KONTRON
INSTRUMENTS

UVIKON 860

Instruction manual

Dear Customer

Congratulations on choosing a KONTRON Instrument.

From today .....

your UVIKON 860

Serial No. .....

is operational.

All KONTRON instruments are manufactured with care and attention. Each instrument is fully tested before leaving the factory.

Please follow the installation instructions and read the section on operation of the instrument.

We are sure that you will have many hours of excellent operation and we wish you much success in your work.

Yours sincerly

Antonio Menna
Product Manager
UV/VIS Spectrophotometry

KONTRON INSTRUMENTS AG

CH - 8010 Zürich

WARNINGS

- CHECK INSTRUMENT'S OPERATING VOLTAGE.
  VOLTAGE IS MARKED ON THE BACK OF THE INSTRUMENT
  SEE CHAPTER 1.4

- ALWAYS DISCONNECT THE MAINS PLUG BEFORE STARTING ANY WORK INSIDE THE INSTRUMENT.

- HIGH VOLTAGE REMAINS IN THE MONITOR DRIVER AND HV POWER SUPPLY EVEN WHEN THE INSTRUMENT IS DISCONNECTED FROM MAINS. THEREFORE DO NEVER TOUCH TERMINALS.

- FOR LAMP CHANGE OR ADJUSTMENT FOLLOW THE INSTRUCTIONS IN CHAPTER 5.
  NEVER TOUCH THE LAMP CHANGE MIRROR NOR THE QUARTZ WINDOWS INSIDE THE SAMPLE COMPARTMENT.

- SET WAVELENGTH TO ZERO FOR TRANSPORT TO PROTECT THE WAVELENGTH DRIVE.

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This part contains the instructions for the installation of the UVIKON 860.

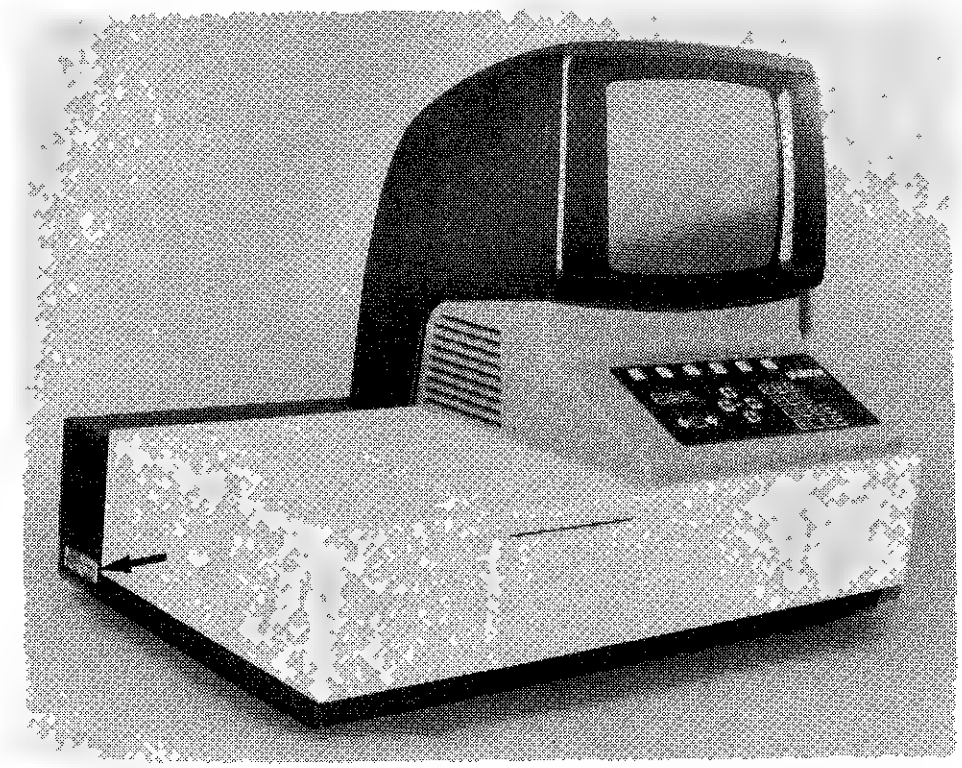
1.1 UNPACKING

- open original packing box
- lift cardboard box and remove it
- release the 4 nuts on the instruments base
- pull out the 4 U-profiles
- lift the instrument from its base and place it on a table
- remove the white cardboard box
- remove dust cover
- remove the cardboard support underneath the sample compartment cover
- put the cell holder (in the white cardboard box) into the sample compartment

In order to prevent damage during transit it is important to ship the instrument in its original packing box.

1.2 CHECKING THE INSTRUMENTS SERIAL NUMBER

The plate with the serial number is mounted on the left side of the instrument. This number must be identical with the serial number on the delivery note.



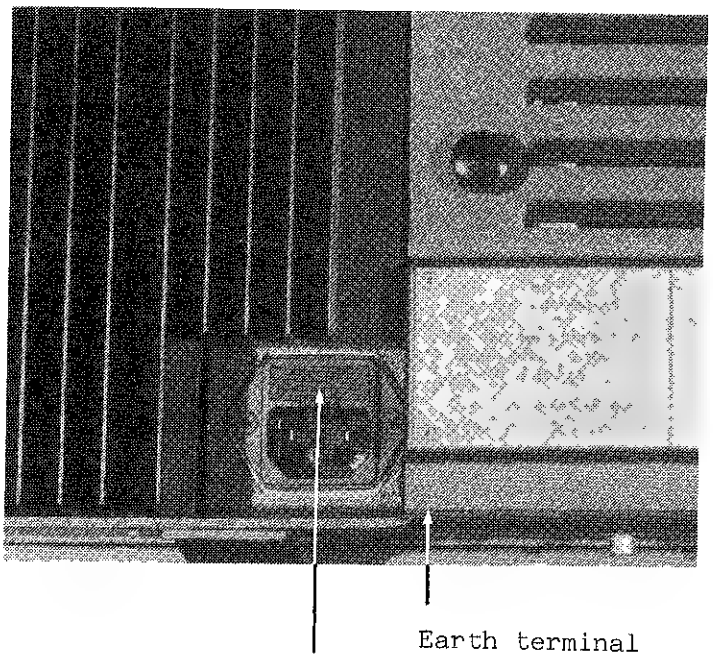
1.3 CHECKING THE DELIVERY

Check the contents of the consignment with the delivery note. If parts are missing or damaged inform your local KONTRON representative. Following standard parts are supplied with the instrument:

Description	Order no.
Power cord Schuko	55-65601
Dust cover 860	91-00456
Cell holder	89-00066
Instruction manual	95-00172
Installation report	84-00046
Fuse 220V 2A slow blow Ø 5x20 mm	62-13002
Fuse 110V 4A slow blow Ø 5x20 mm	62-13015

1.4 CHECKING THE MAINS SUPPLY

The UVIKON 860 is factory set for 220V, 50Hz operation. Before you connect the instrument to the mains, make sure that the operating voltage of the instrument is the same as the local mains supply. If not, please inform your local KONTRON service representative. The instrument can easily be adapted to the following mains voltages:
100/110/120/200/220 and 240 VAC. The mains outlet must have the protective earth connection (if there is no earth connection in the mains outlet the earth terminal underneath the instrument has to be used to connect with proper earth).



mains voltage	fuse rating
100V	4A
110V	4A
120V	4A
200V	2A
220V	2A
240V	2A

Changing mains fuses

- unplug power cord
- open snap cover on top of mains inlet
- remove old fuse
- insert new fuse with correct rating (slow blow)
- close snap cover

1.5 CONDITIONS FOR THE INSTRUMENT INSTALLATION

The installation site of the instrument should be such that it is not subjected to dust, vapors of solvents and acids, as well as vibration, which would adversely influence the specifications of the instrument over a longer period of time.
The ambient operating temperature must be within +2°C and +35°C. Care should be taken that the space between the right side of the instrument and the wall is at least 10 cm.
The lamps may need readjustment after transport. For lamp adjustment see chapter 5.

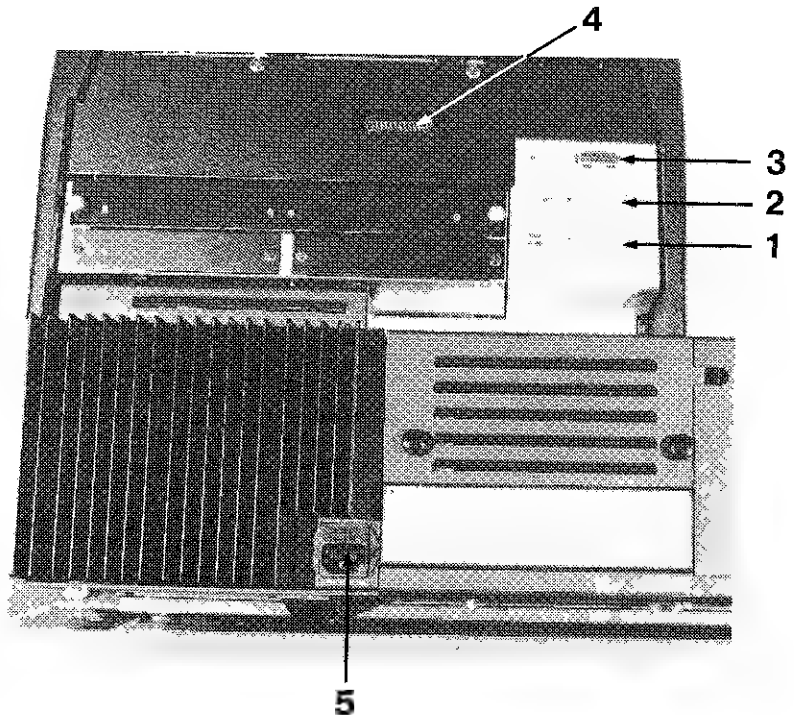
1.6 CONNECTION OF CABLES

- connect the mains cable no. 55-65601

when peripherial equipment is available:

- connect signal cable from analog recorder
- connect signal cable from the Printer Plotter P-800
- connect signal cable from the computer
- connect signal cable from Sampler 99

Standard connections for peripheral equipment



1 Centronics Interface for optional KONTRON Printer/Plotter P800

2 Sampler 99 output 15-pin male type D socket

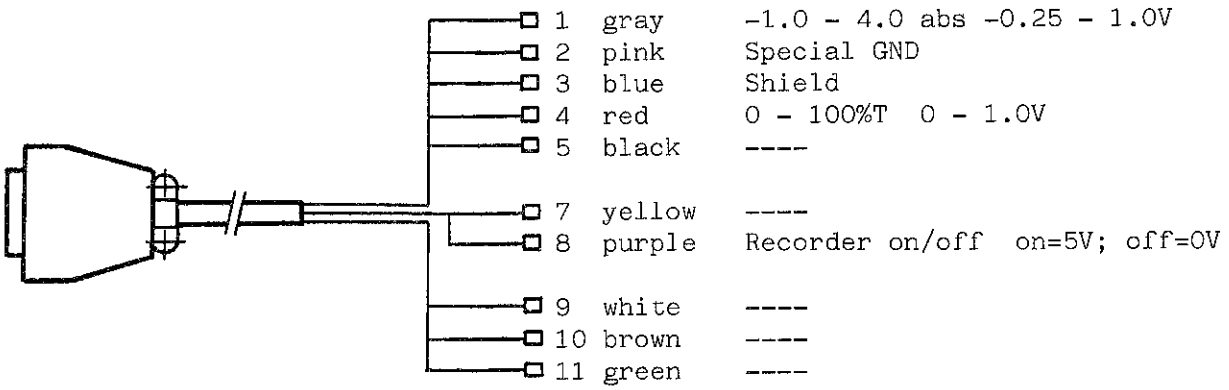
3 Analog output 15 pin female type D socket

4 RS 232C-Interface for Computer

5 Mains input with fuses

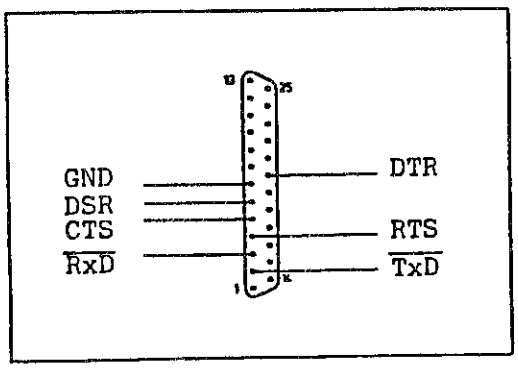
Recorder cable

The recorder cable can be used for any analog Y/t recorder. It plugs into the 15-pin socket on the back of the instrument. The following signals are available.



Cable ends not used must be insulated.

Pin assignment of RS232-Interface

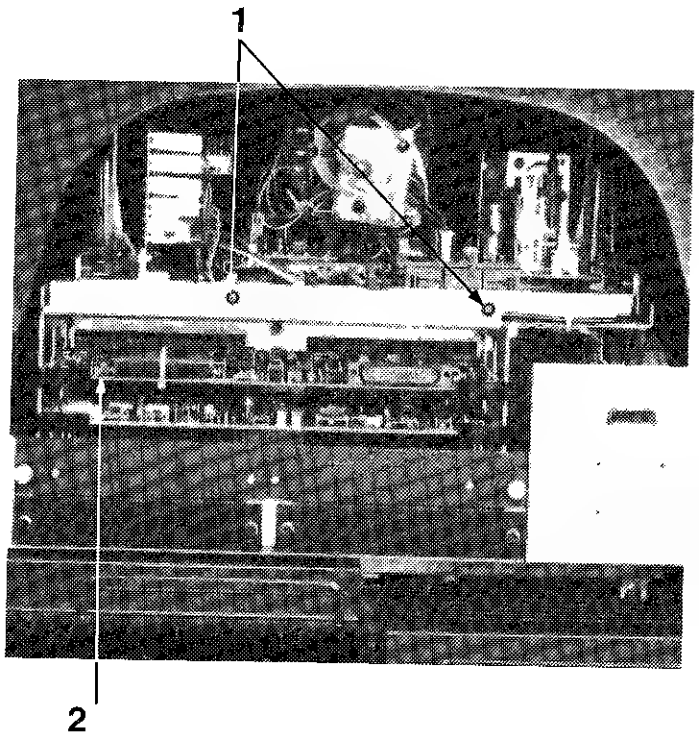


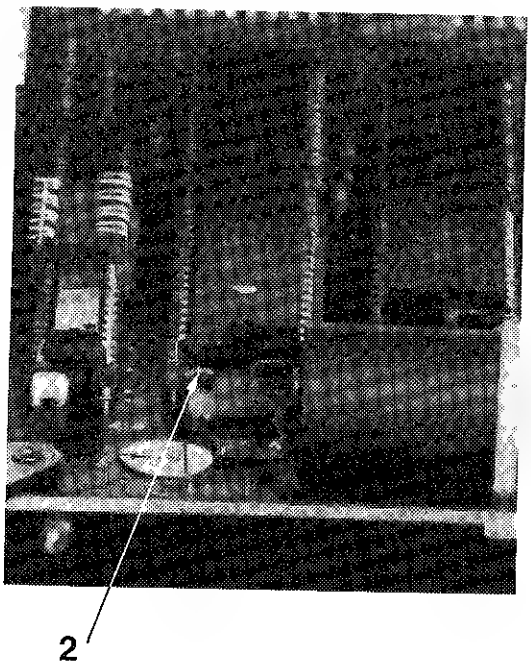
1.7 FILE MEMORY BUFFER

The file memory is buffered by a lithium battery on the Central Processing Unit board (CPU88). It could be necessary to switch on the battery on the CPU88 if the instrument is not installed by a service engineer.
If the battery is switched off then files will be deleted after switching the instrument off. The lifespan is about two years. Call service engineer for replacement.

To switch on battery buffer:

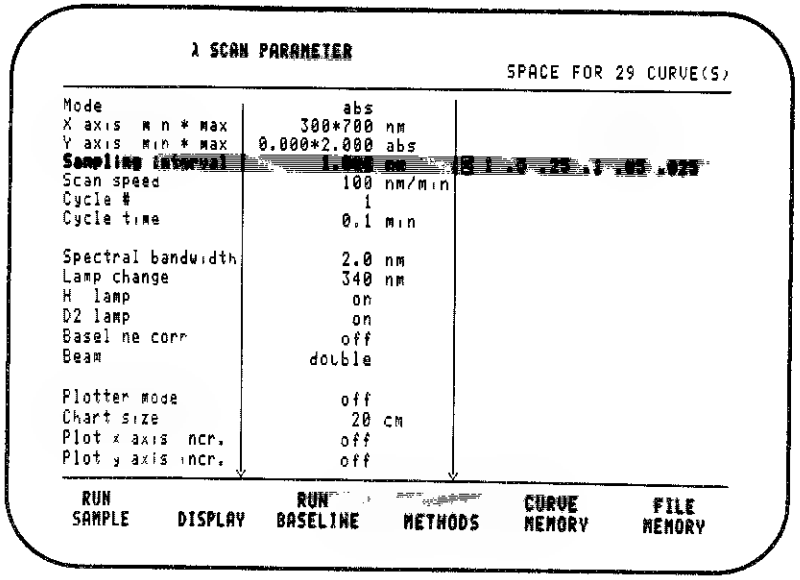
1. Disconnect the mains plug before starting.
2. Locate the two screws 1 (picture 1) on the back cover, loosen the screws and remove back cover.
3. Locate CPU88 (the battery and the plug for the serial Interface are connected to this board).
4. Pull out CPU88
5. Locate the small blue switch close to the battery. (Picture 2)
6. Close the switch.
7. Press CPU88 firmly back into its place and install back cover.
8. Your files and curves will now remain in the memory even if the instrument is switched off.





2.3 THE CRT MONITOR

The monitor is divided into three main sections:



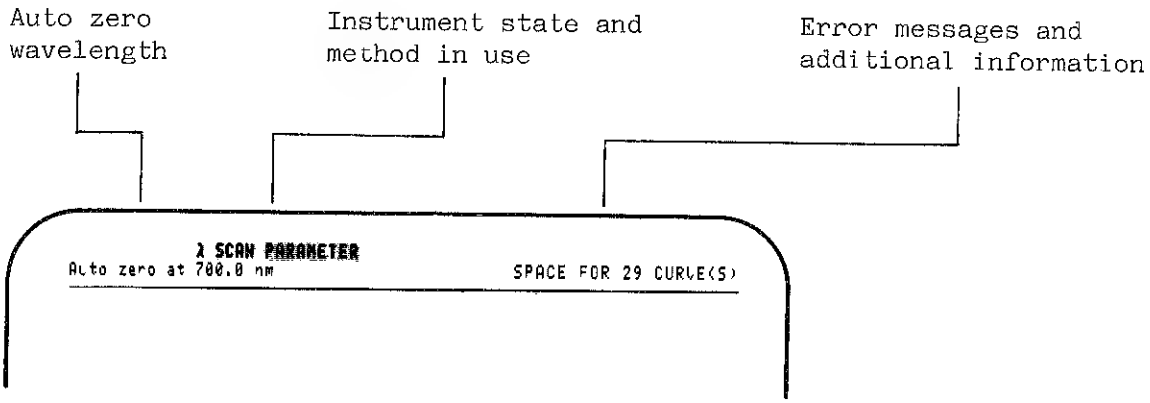
Instrument state and message section

Parameter input/ Result output section

UVISOFT key section

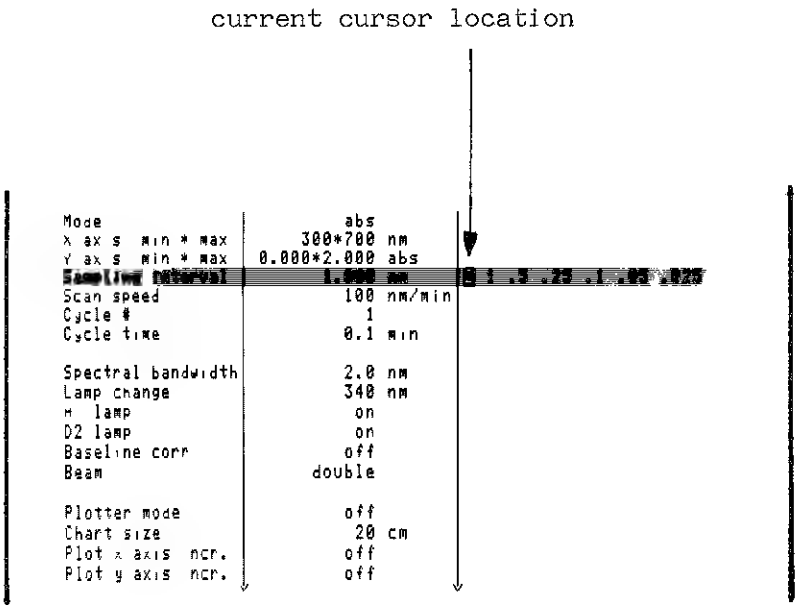
2.3.1 INSTRUMENT STATE AND MESSAGE SECTION

This section informs you about the actual method in use. The auto zero wavelength is displayed.
Error messages are displayed on the right hand side. The same space is used to provide additional information when entering parameters.



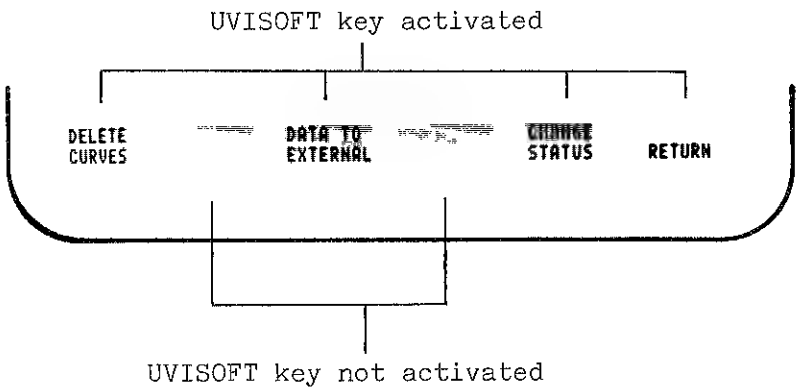
2.3.2 PARAMETER INPUT / RESULT OUTPUT SECTION

The parameters for measurement and calculation are entered in this section. The cursor keys on the keyboard are used to shift the cursor to the desired spot on the screen. It can be moved within defined locations to enter parameters or to modify displays. The cursor is also used to "scroll" the input/output section of the screen

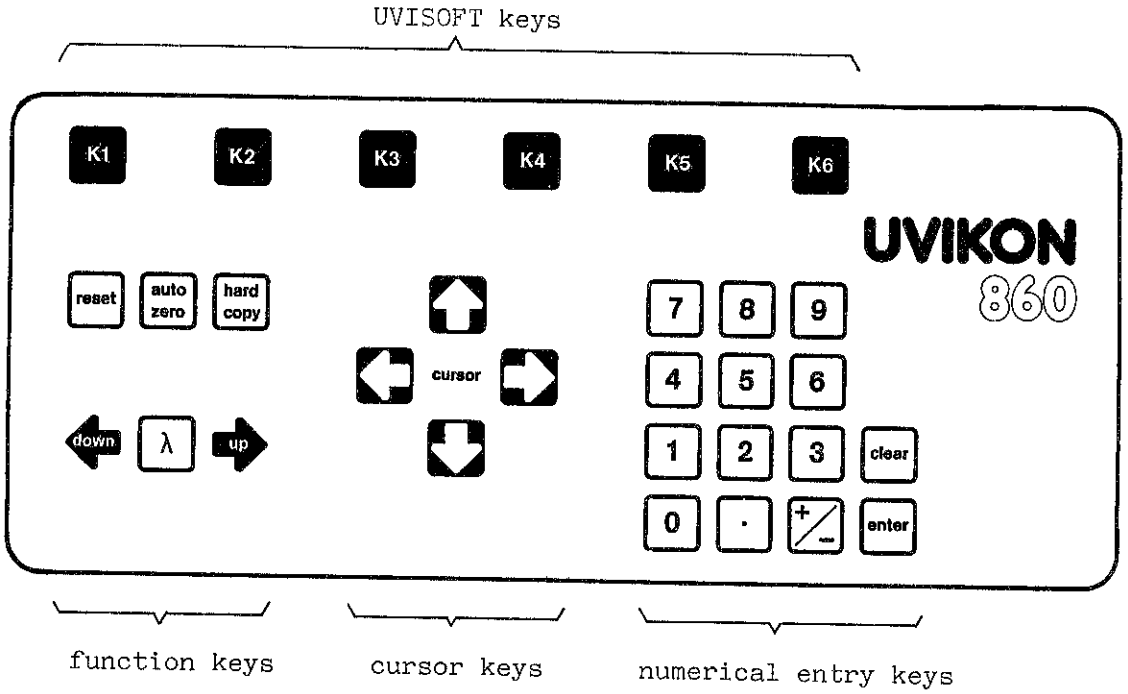


2.3.3 UVISOFT key section

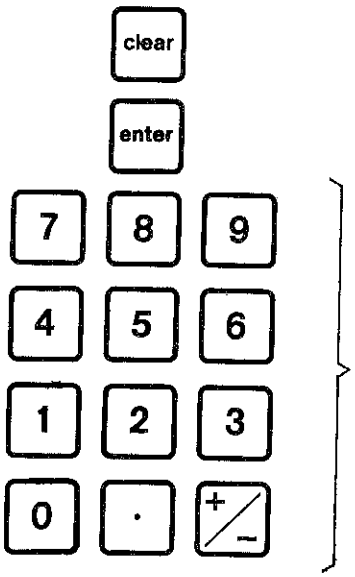
The software defined "UVISOFT" keys K1-K6 are located on the keyboard. The function of each key is displayed on the monitor



2.4 KEYBOARD



2.4.1 NUMERICAL ENTRY KEYS



Clears the last number entered
Resets errors or error messages (see chapter 4)

Stores an entered or cursor selected value

To enter numerical values

2.4 KEYBOARD (cont.)

2.4.2 FUNCTION KEYS

The three λ-control keys are activated when the instrument shows the display or results page and the wavelength and absorbance or transmission values are displayed in the input /output section. To enter a new wavelength press the λ-key and enter the desired wavelength with the numerical keys. Press the enter-key to terminate the input. The up/down keys are used to move the monochromator manually. The monochromator can be moved in single steps by pressing the key repeatedly. For continuous movement keep the key pressed.

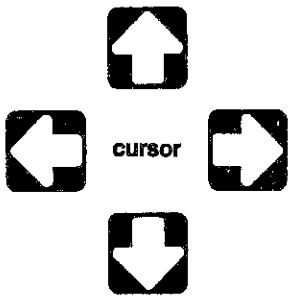
The reset-key is always activated, except during a calculation task (e.g. AUTOSCALING, PEAK DETECTION RUN, etc.). Pressing the reset-key causes the instrument to terminate all current activities and to set up the Methods page. All data and parameters stay in memory.

The auto zero-key is activated when the instrument is in standby and shows the parameter or display page. By pressing the auto zero key the wavelength and the auto zero value is displayed in the upper left hand corner of the screen. The auto zero can be deleted by pressing the key a second time. When measuring single beam a new auto zero is stored every time the key is pressed.

The hard copy-key is activated when the optional Printer/Plotter P800 is connected. The hard copy function is used to obtain curves, result listings or parameter listings from the screen onto paper.

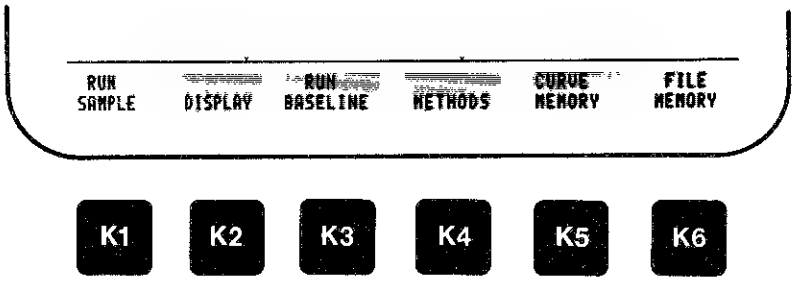
2.4 KEYBOARD (cont.)

2.4.3 CORSOR KEYS



The cursor keys are used to move the cursor within defined locations in the input/output section of the screen. The cursor is also used to scroll the parameter page.

2.4.4 UVISOFT KEYS



Screen

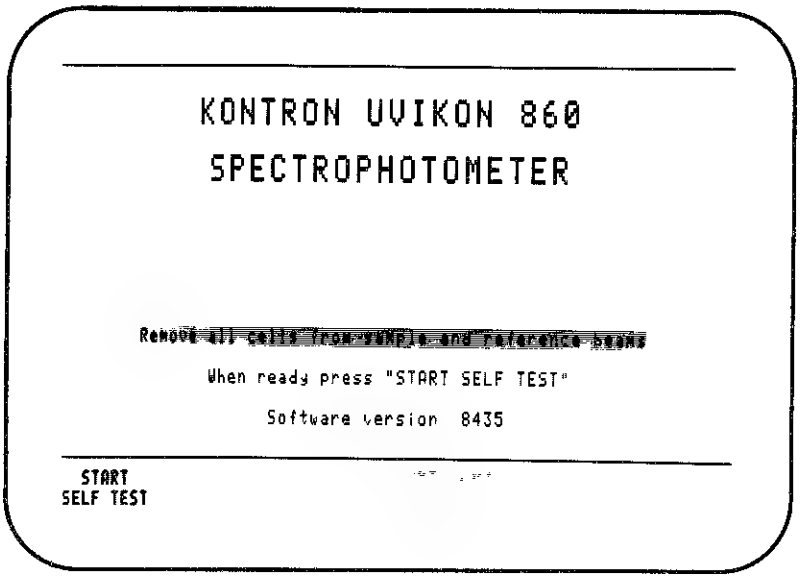
Keyboard

The UVISOFT keys are used to control the instrument. The related function to each key (K1-K6) on the keyboard is displayed in the UVISOFT key section of the screen. A softkey is only activated when the function is displayed in the corresponding field on the screen. UVISOFT keys may be not activated when errors appear (see chapter 4).

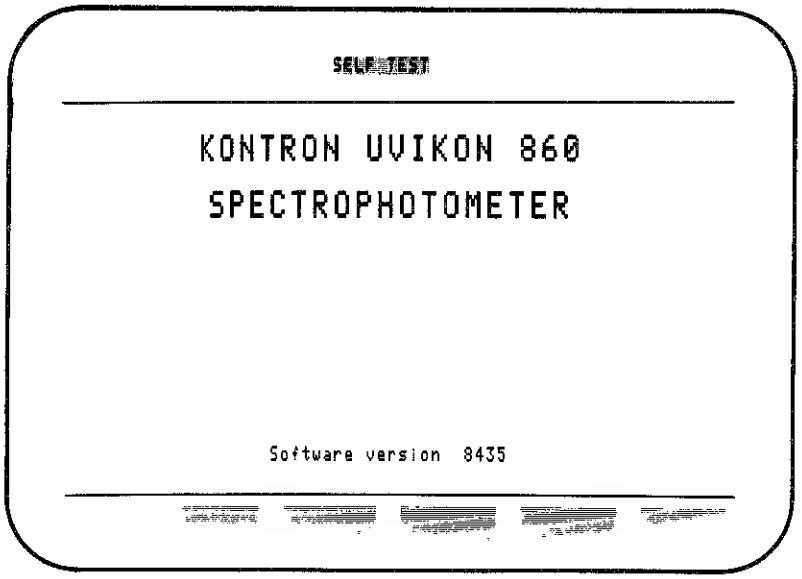
2.5 SELF TEST

The following picture appears on the screen when the instrument is switched on.

Instrument controlled accessories are acknowledged and displayed when active.



Press K1
START SELF TEST



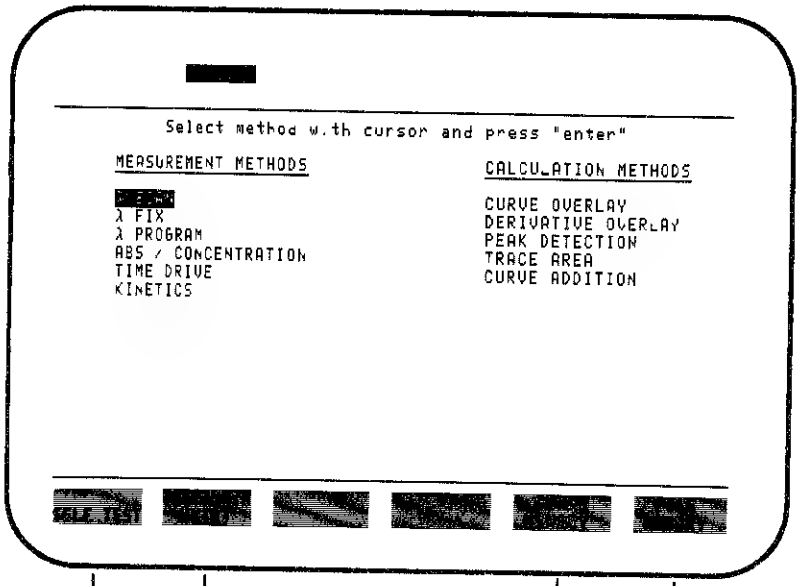
The Self Test includes the following checks:

- Memory
- Mains frequency
- H lamp
- D2 lamp
- Data transfer
- Wavelength drive
- Baseline

For error messages see chapter 4.

2.6 METHODS PAGE

The Methods page is set up automatically after the Self Test has completed without detected errors, or anytime the "reset" is pressed on the keyboard.



Methods page of Software Pack 3

Sets up FILE MEMORY page to access a file

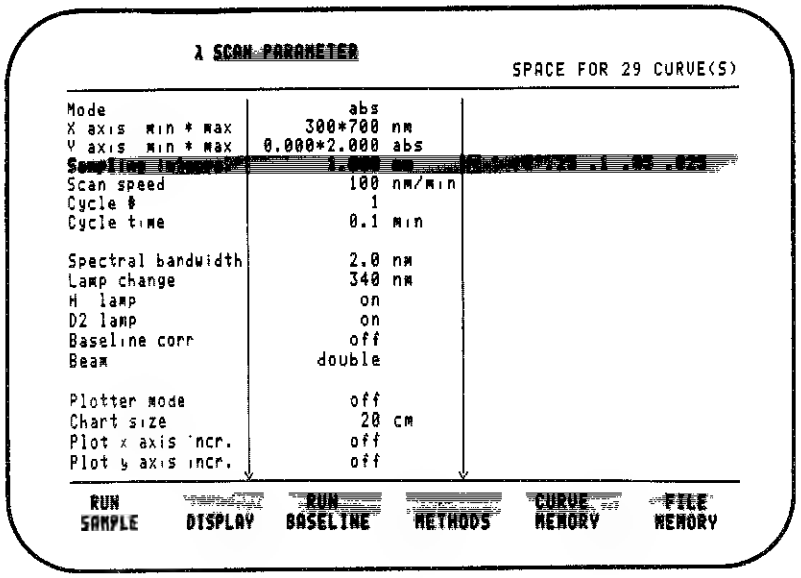
Sets up CURVE MEMORY page to protect or unprotect curves

Sets up USER DATA ENTRY page

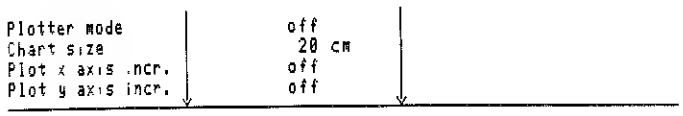
Restarts SELF TEST

2.7 PARAMETER PAGE

Each method has its own parameter page with all method-specific parameters listed in the input/output section of the screen.



λ-Scan parameter page



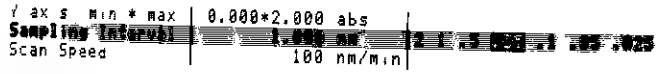
Arrows indicate additional parameter lines

Additional parameter lines are accessed by scrolling the input/output section of the screen. Press cursor up or down until the cursor reaches the top or bottom line. Further pressing will cause the screen to scroll. Every method uses different UVISOFT keys on the parameter page. For description see chapter 3.3.

2.7 PARAMETER PAGE (cont.)

There are two ways to enter a parameter:

- Select defined values with cursor  or cursor 



press "enter" to store the selected value

or:

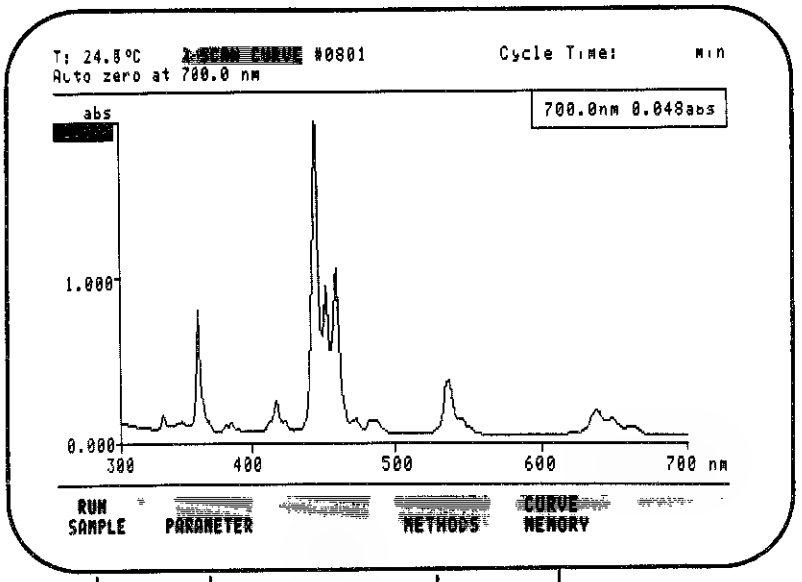
- Enter desired value within the displayed limits with the numerical keys. Exceeding the upper or lower limit will generate an error message (see chapter 4).

press "enter" to store the desired value.

2.8 DISPLAY PAGE

Results can be displayed as curves or as digital values.

2.8.1 CURVE DISPLAY



Scale Y and Scale X can be modified by the cursor and the numerical keys. The same limits as on the parameter page are valid.

Sets up CURVE MEMORY page

Sets up METHODS page

Sets up PARAMETER page

Increments sample number by 1 and measures new sample with same parameters

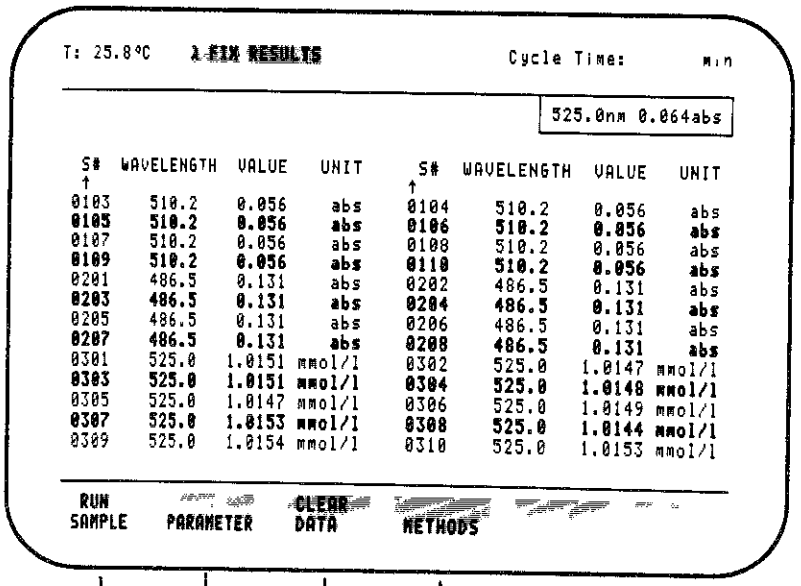
The framed display shows the current monochromator wavelength and the currently measured abs or %T value.

To change the monochromator wavelength press the [λ] key and enter the new wavelength via the numerical keys.

Use the down up keys for manual scanning

2.8 DISPLAY PAGE (cont.)

2.8.2 DIGITAL RESULTS DISPLAY



Sets up METHODS page

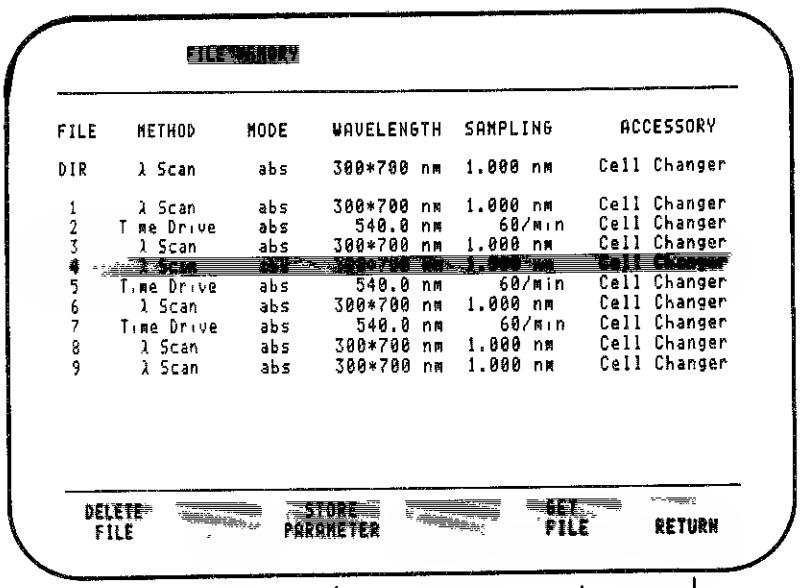
Clears all data

Sets up PARAMETER page

Increments sample number by 1 and measures new sample with same parameters

2.9 FILE MEMORY PAGE

Ten files are permanently stored. No file data is lost when the instrument is switched off or disconnected from mains. The file memory is used for measurement methods only.
The DIR-file is used for "Direct file access". If "Direct file access" is set "on" on USER DATA ENTRY page, the DIR-file parameter will be set up automatically after the self test has been completed. The DIR-file can be used like the other 9 files if direct file access is "off".



Only the vertical cursor keys are activated.

When you create a new file Move the cursor to the desired line, or DIR will be deleted and used to store the new parameters

Returns to last page

Calls cursor selected file

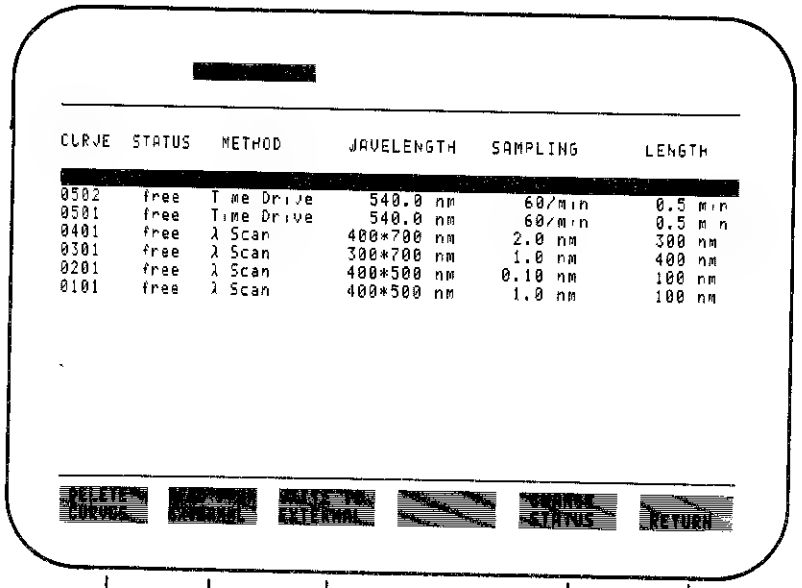
Stores parameters into cursor selected file number. Only activated when file memory was selected from PARAMETER page.

Deletes cursor selected file

Files can be protected against being overwritten (see chapter 3.6.2 USER DATA ENTRY)

2.10 CURVE MEMORY PAGE

Measured curves are automatically written into the curve memory. If the curve memory is full and a new curve is measured, then unprotected curves are overwritten.



Only the vertical cursor keys are activated.

Use the cursor to scroll the input/ output section when more than 16 curves are stored

Returns to last page and deletes all curves with delete status.

Sets the status of the cursor selected curve to protect, free or delete. Free curves are automatically deleted when the curve memory is full and a new measurement is started.

Curve data of cursor selected curve is sent to external computer via RS 232C interface.

Reads curve data from an external computer. See chapter 3.6

Deletes all curves with delete status and rewrites curve Memory page.

2.10.1 CALCULATION OF AVAILABLE CURVE MEMORY SPACE

The available curve memory space is continuously calculated and displayed in the message section when curve parameters are entered. However, it may be useful to calculate the necessary space in advance e.g. when SAMPLER 99 is used.

Every measured curve point needs 2 bytes of curve memory.

Example: How many curves can be stored with the following parameters?

Scale X	400-600 nm = 200nm scan width
Sampling interval	0.5nm/point

Amount of curve points for one scan:

$$\frac{\text{scan width}}{\text{sampling interval}} = \frac{200\text{nm}}{0.5\text{nm/point}} = 400 \text{ points}$$

Amount of bytes for one scan:

$$400 \text{ points} \times \frac{2 \text{ bytes}}{\text{point}} = 800 \text{ bytes}$$

The basic memory configuration has 26000 bytes of available curve memory

Therefore: (with above parameters)

$$\frac{26000 \text{ bytes}}{800 \text{ bytes/curve}} = 32 \text{ curves} \quad \text{can be stored}$$

To obtain the number of points in time drive just multiply the measurement time with the sampling rate.

Points: measurement time x sampling rate = points

Bytes: points x 2 bytes/point = number of bytes

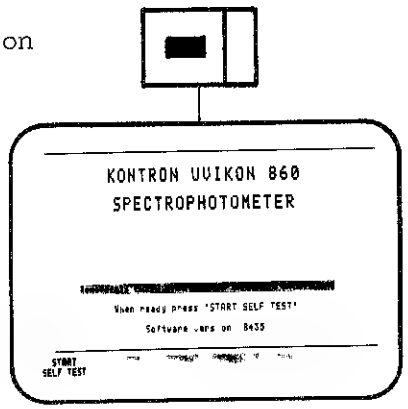
TABLE OF CONTENTS

3.1 OPERATING HINTS

The UVIKON 860 must be installed according to the installation instruction (chapter 1). To avoid eye fatigue when working with the screen over a long period place the instrument away from windows or brightly lit areas.

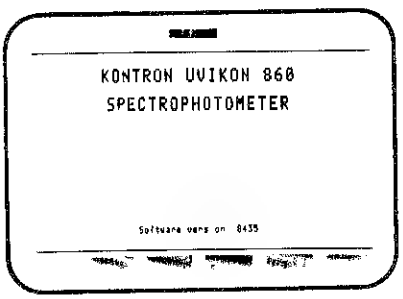
3.2 INITIALIZATION

Power on

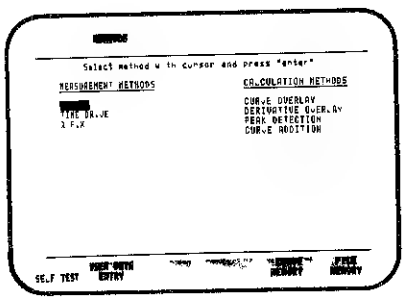


- Automatic ignition of Deuterium- and Halogen lamp
- Setting up title page
- Display of software version

- START SELF TEST



- Setting up SELF TEST page
- The self test program takes about 3 min and performs the following checks:
  - Memory
  - Mains frequency
  - H lamp
  - D2 lamp
  - Data transfer
  - Wavelength drive
  - Baseline



- Setting up METHODS page

The instrument is ready to operate. The operating method can now be selected.

3.3 PROGRAMMING

The UVIKON 860 has two kinds of operation methods:

- Measurement methods
- Calculation methods

Each of the methods are described with an example in chapter 3.4.

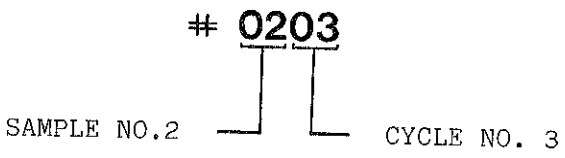
Key functions and monitor pages are described in chapter 2.

GENERAL REMARKS

After power on each method is programmed with preset values. When parameters are changed the values remain in the memory until the instrument is switched off.

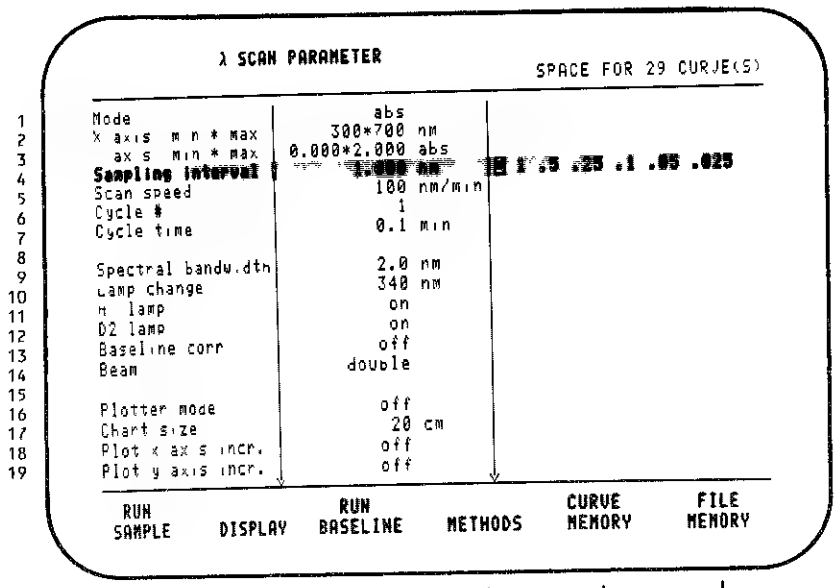
The instrument automatically generates a number for each measured curve in λ-Scan and Time drive. Special numbers are used for the optional method "KINETICS".

Curve or sample number:



3.3.1 LAMBDA SCAN applies to SW Pack 1, 2 and 3

The Lambda scan parameter page



Basic instrument configuration

Sets up FILE MEMORY page to store parameters

Sets up CURVE MEMORY page to protect, free or delete curves

Sets up METHODS page

Stores new baseline. All parameters above except "Sampling Interval" are used to measure the baseline.

Sets up DISPLAY page

Sets up DISPLAY page and measures new sample. Increments the sample number by 1.

3.3.1 LAMBDA SCAN applies to SW Pack 1, 2 and 3 (cont.)

Line 1:

Mode	abs	abs %T

Defines the working mode absorbance or % transmittance.
The measurement Mode is coupled with line 3 "Y axis" and line 19 "Plot Y axis incr.". The preset values or the last entered values in line 3 and 19 are automatically changed according to the selected mode.

Line 2:

X axis min * max	300*700 nm	180≤	≤900*≤	≤900

Defines the scan range.
X axis is coupled with line 4 "Sampling Interval", line 6 "Cycle number" and line 23 "Cells to measure" if a cell changer is connected. The available curve memory space is automatically updated and displayed in the message section whenever parameters are changed. See chapter 2.10.1 for calculation of available curve memory space. An error message is displayed if the required lamp is not switched on (see chapter 4).

Line 3:

Y axis min * max	0.000*2.000 abs	-.3≤	≤4*-.3≤	≤4

Defines the Y-axis on the display.
Y axis is coupled with line 1 "Mode". The preset values or the last entered values are automatically written into the second column when the mode is changed.

Line 4:

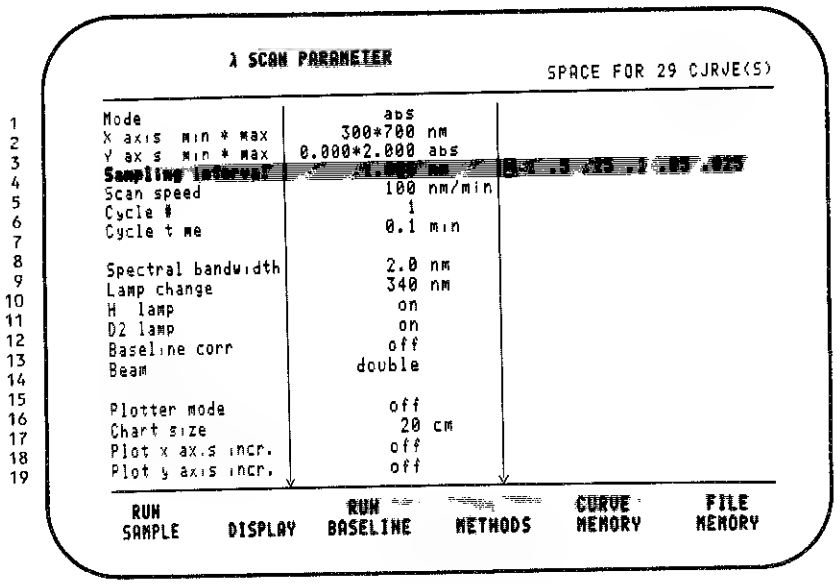
Sampling interval	1 nm	2 1 .5 .25 .1 .05 .025

Defines the resolution of the measured curve.
The Sampling interval is coupled with line 2 "X axis", line 6 "Cycle number" and line 23 "Cells to measure" if a cell changer is connected. The available curve memory space is automatically updated and displayed in the message section when parameters are changed. Due to the length of the chopper cycle some scan speeds cannot be used with all sampling intervals. The following list shows all possible combinations of sampling intervals and scan speeds.

Sampling Interval	Possible scan speeds (50Hz) in nm/min						
2.0	1000	500	250	100	50	25	10
1.0	1000	500	250	100	50	25	10
0.5	500	250	100	50	25	10	
0.25	250	100	50	25	10		
0.1	100	50	25	10			
0.05	50	25	10				
0.025	25	10					

other combinations produce an error message (see chapter 4)

3.3.1 LAMBDA SCAN applies to SW Pack 1,2 and 3 (cont.)



Line 5:

Scan speed	100 nm/min 1000 500 250 100 50 25 10

The Scan speed is coupled with line 4 "Sampling interval". See line 4 for possible combinations of sampling intervals and scan speeds.
The scan speed depends on mains frequency.

Mains frequency	Scan speed nm/min
50 Hz	1000 500 250 100 50 25 10
60 Hz	1200 600 300 120 60 30 12

The mains frequency is detected by the instrument and the correct speeds are automatically displayed on line 5.

Line 6:

Cycle #	1	1≤ ≤99

To automatically repeat the measurement, select the number of measurements desired.
The Cycle number is coupled with line 2 "X axis", line 4 "Sampling Interval" and line 23 "Cells to measure" if a cell changer is connected.
The available curve memory space is automatically updated and displayed in the messages section when parameters are changed.

3.3.1 LAMBDA SCAN applies to SW Pack 1, 2 and 3 (cont.)

Line 7:

Cycle time	0.1 min	0<	≤9999

Selects the time interval between measurement repetitions.
If the cycle time is shorter than the actual time necessary for the scan, the instrument will ignore the cycle time and the following cycle will start without a pause, as long as desired.

Line 8: Space

Line 9:

Spectral bandwidth	2 nm	4 2 1 .5

The Spectral bandwidth can only be selected if the instrument is equipped with the optional slit change mechanism, otherwise a space appears on this line.

Line 10:

Lamp change	340 nm	290≤	≤400

Defines the lamp change during a scan.
The lamp change is coupled with line 2 "X axis" line 11 "H lamp" and line 12 "D2 lamp". The lamp change defines which lamp has to be on for the selected scan range. An error message is displayed if the needed lamp is not lit. See chapter 4.

Line 11:

H lamp	on	on off

The H lamp is coupled with line 10 "Lamp change" and line 2 "X axis". An error message is displayed if the lamp is off for measurements in the visible region. See chapter 4.

Line 12:

D2 lamp	on	on off

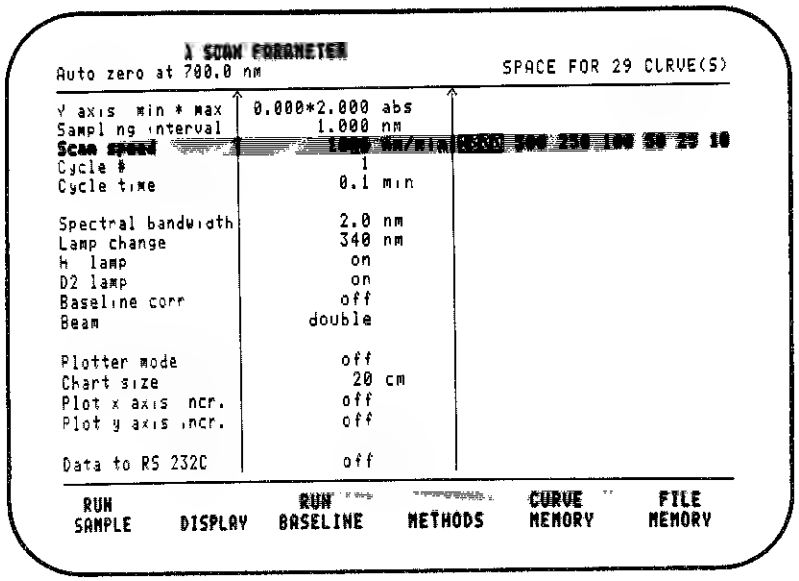
The D2 lamp is coupled with line 2 "X axis" and line 10 "Lamp change". An error message is displayed if the lamp is off for measurement in the UV-range. See chapter 4.

Line 13:

Baseline corr.	off	on off

Baseline correction is coupled with line 14 "Beam". The preset is "on" if the instrument is set to "single beam". All defined parameters are also valid for baseline correction, except the sampling interval will always be 0.5 nm.

3.3.1 LAMBDA SCAN applies to SW Pack 1, 2 and 3 (cont.)



Line 14:

Beam	double	double single

Selects the working mode double or single beam.
Beam is coupled with line 13 "Baseline corr". If "single" is entered the preset on line 13 is "on" and an auto zero is measured at the current wavelength (Scale X max) and displayed in the message section.

Line 15: Space

Line 16:

Plotter mode	off	serial overlay off

Serial or overlay drawings of curves after each measurement are available if the optional printer plotter is connected.

Line 17:

Chart size	20 cm	5≤ ≤150

The chart size defines the length of the curve on the plot.

Line 18:

Plot X axis incr.	off	100 50 20 10 5 2.5 1 off

Plot X axis incr. defines the interval (space) between each grid line on the X axis plot. Unit is nanometers.

3.3.1 LAMBDA SCAN applies to SW Pack 1,2 and 3 (cont.)

Line 19:

Plot Y axis incr.	off	1 .5 .1 .05 .01 .005 off

Plot Y axis incr. defines the interval (space) between each grid line on the Y axis plot. The values are automatically changed when the mode is changed on line 1. Unit is depending on chosen mode, abs or %T.

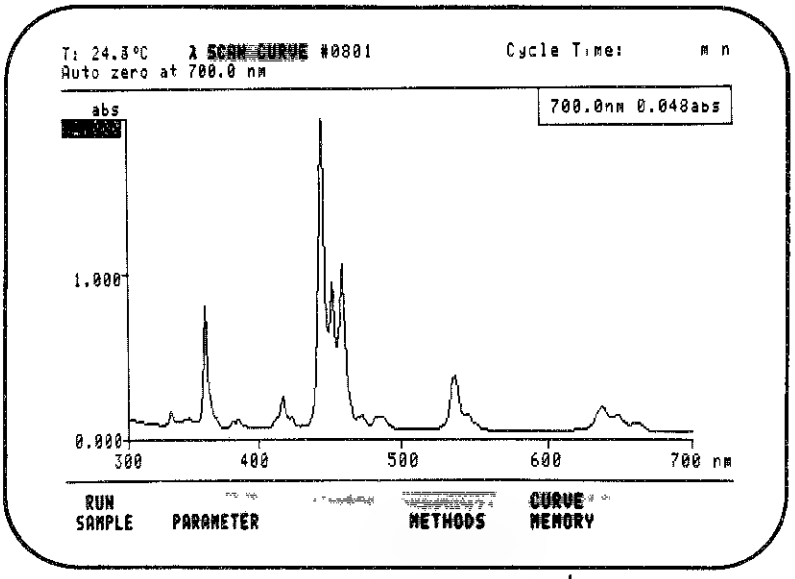
Line 20: Space

Line 21:

Data to RS 232C	off	on off

Activates transfer of measured data to computer via RS 232C interface if on.

The λ-SCAN DISPLAY page



Expand or compress the measured curve by changing the Y axis min/max or X axis min/max values on the screen.

Sets up CURVE MEMORY page

Sets up METHODS page

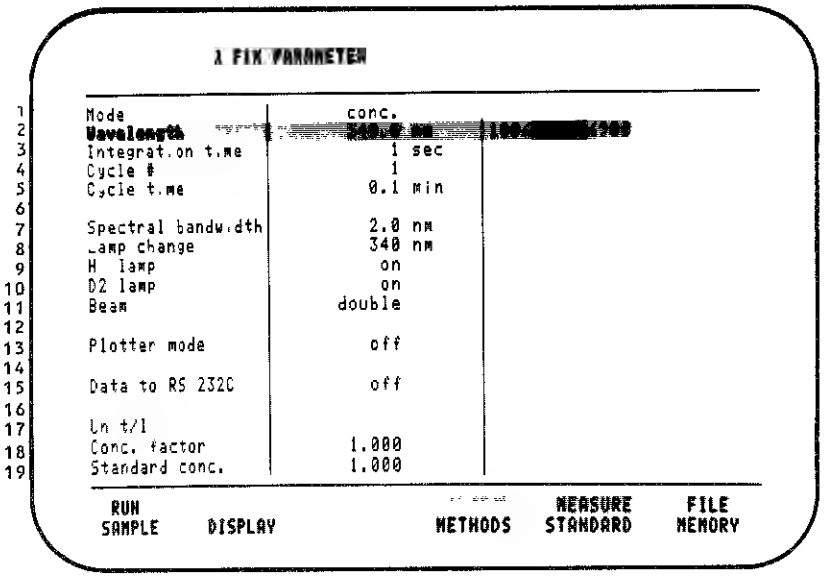
Sets up PARAMETER page

Measures new sample and increments the sample number by 1

Any wavelength can be entered via the [λ] key when the scan is completed. Use the [down] [up] keys for manual scanning

3.3.2 LAMBDA FIX applies to SW Pack 1, 2 and 3

The LAMBDA FIX PARAMETER page



Sets up FILE MEMORY page to store parameters

Measures standard, calculates and displays conc. factor. Only activated when conc. mode is selected

Sets up METHODS page

Sets up DISPLAY page

Sets up DISPLAY page and measures new sample. Increments the sample number by 1

3.3.2 LAMBDA FIX applies to SW Pack 1, 2 and 3 (cont.)

Line 1:

Mode	abs	abs %T conc

Defines the working modes.
Mode is coupled with line 17 "Unit/l", line 18 "conc factor" and line 19 "Standard conc". You can enter the standard concentration on line 19 when conc. is selected. UVISOFT key K5 "MEASURE STANDARD" is activated in the conc. mode only.

Line 2:

Wavelength	540.0 nm	180≤	≤900

Defines the wavelength of the measurement

Line 3:

Integration time	1 sec	1≤	≤60

Selects the time interval for the integration.
Use a long integration time for samples with low %T or high abs values.

Line 4:

Cycle =	1	1≤	≤99

To automatically repeat the measurement, select the number of measurements desired.

Line 5:

Cycle time	0.1 min	0≤	≤9999.9

Selects the time interval between measurement repetitions.
If the cycle time is shorter than the integration time the instrument will ignore the cycle time, except when more than one cycle is programmed, then a combination error message will occure.

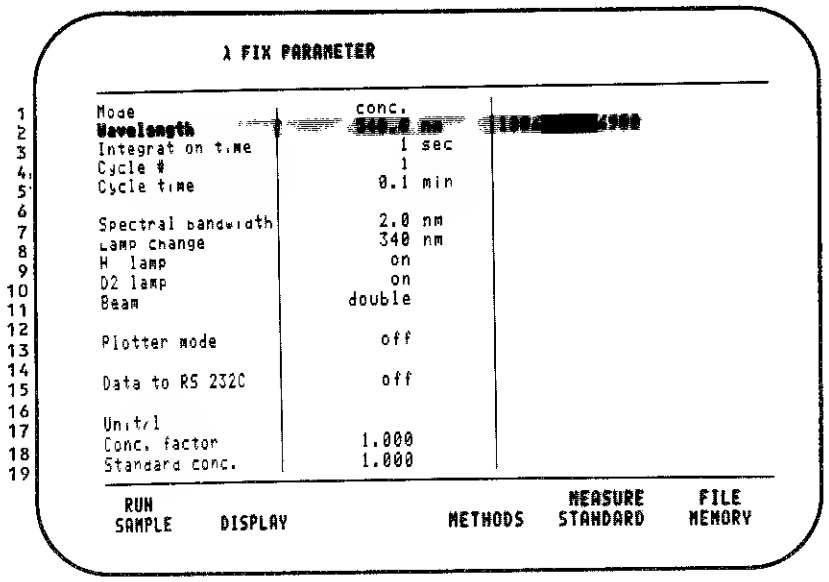
Line 6: Space

Line 7:

Spectral bandwidth	2.0 nm	4 2 1 .5

Selects the spectral bandwidth if the instrument is equipped with the optional slit change mechanism, otherwise a space appears instead of this line.

3.3.2 **LAMBDA FIX** applies to SW Pack 1, 2 and 3 (cont.)



Line 8:

Lamp change	**340 nm**	**290≤ ≤400**

The lamp change defines which lamp has to be on for the selected wavelength. An error message is displayed if the required lamp is not lit. See chapter 4.

Line 9:

H lamp	**on**	**on off**

An error message is displayed if the H-lamp is off for measurements in the visible region. See chapter 4.

Line 10:

D2 lamp	**on**	**on off**

An error message is displayed if the D2-lamp is off for measurements in the UV-region. See chapter 4.

Line 11:

Beam	**double**	**double single**

Selects the working mode single beam or double beam.
If "single" is entered an auto zero is measured at the current wavelength (line 2 "Wavelength") and displayed in the message section.

3.3.2 **LAMBDA FIX** applies to SW Pack 1, 2 and 3 (cont.)

Line 12: Space

Line 13:

Plotter mode	**off**	**on off**

Prints a result listing after each sample run. Useful when many cycles are measured or when an optional cell changer is used.

Line 14: Space

Line 15:

Data to RS 232C	**off**	**on off**

Activates transfer of measured data to computer via RS 232C interface if on. The following output format is produced:

0201 540.0 0.1642 mmol/l CR

Line 16: Space

Line 17:

Unit/l	**off**	**g mg ug mol mmol umol off**

The selected unit will be displayed next to the measured value on the results page.

Line 18:

Conc. factor	**1.000**	**.001< <9999**

The concentration factor can be entered manually or is calculated if UVISOFT key MEASURE STANDARD is used.

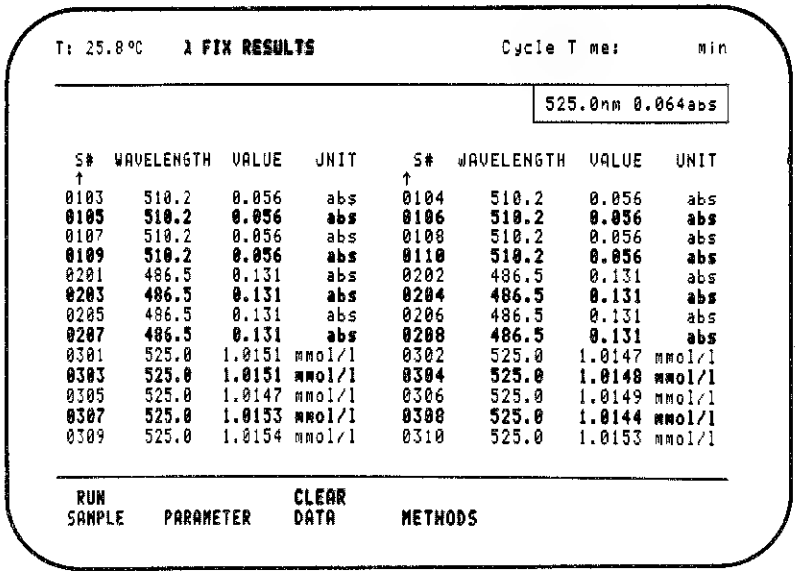
Line 19:

Standard conc.	**1.000**	**.001< <9999**

The entered standard concentration will be used to calculate the concentration factor.

3.3.2 **LAMBDA FIX** applies to SW Pack 1, 2 and 3 (cont.)

The LAMBDA FIX RESULTS page



99 lines are available for results display. All lines are printed with "hard copy".

Sets up METHODS page

Clears all measured data (99 lines max)

Sets up PARAMETER page

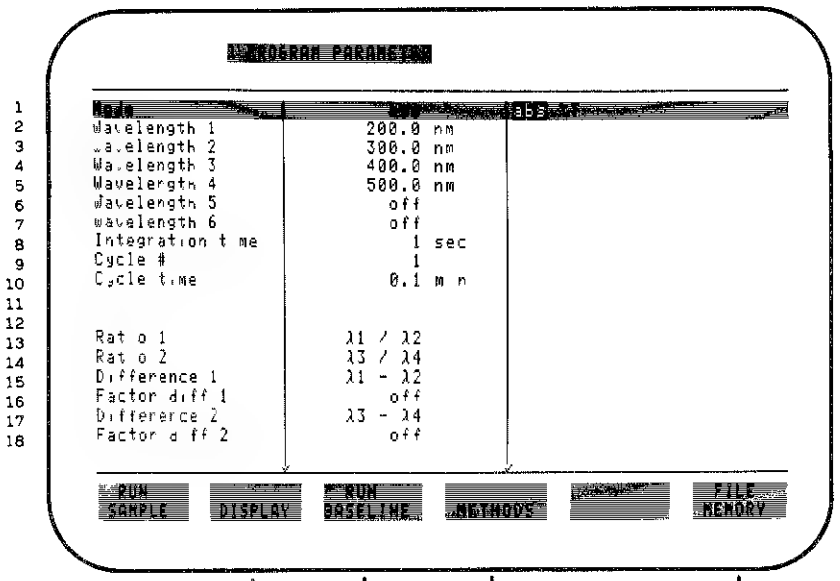
Measures new sample and increments the sample number by 1.

Any wavelength can be entered via the [λ] key when measurement is completed. Use the down up keys for manual scanning.

3.3.3 LAMBDA PROGRAM applies to SW Pack 1 and 3

Up to 6 different wavelengths can be measured with one sample run. Ratios can be calculated and multiplied with a factor. A baseline point for each wavelength can be stored in advance. The baseline values are displayed along with all other measurement values on the Display page.

The LAMBDA PROGRAM PARAMETER page



Sets up FILE MEMORY page to store parameters

Sets up METHODS page

Stores a baseline point for each selected wavelength. Set the parameter "Baseline point" on, to use the stored baseline

Sets up DISPLAY page

Sets up Display page and measures new sample

3.3.3 LAMBDA PROGRAM applies to SW Pack 1 and 3 (cont.)

Line 1:

Mode	abs	abs %T

Defines the working mode
Mode is coupled with line 16 and 18 Factor diff 1 + 2. Factors are only available when using the abs mode.

Line 2-7:

Wavelength 1	200 nm	180≤ ≤900 off

Defines up to 6 measurement wavelengths
The wavelength lines are coupled with the calculation lines 13-18. A combination error message will occur if any of the wavelengths defined for the ratio calculation have not been programmed.

Line 8:

Integration time	1 sec	1≤ ≤60

Sets the time for the integration on one wavelength. Use a long integration time for samples with low %T or high abs values.

Line 9:

Cycle #	1	1≤ ≤99

Defines the number of repeated measurements with the same parameters.

Line 10:

Cycle time	0.1 min	0< ≤9999.9

Defines the time interval between repeated measurements. The cycle time is ignored if the total integration time is longer than the selected cycle time.

Line 11+12: Are only active if one of the following accessory is connected, otherwise either one or two blank lines are displayed.

Line 11:

Cells to measure	1	1 2 3 4 5 6 delete

Active if a Cell Changer is connected.
You can now select any combination of cells. Measurement will always start with the lowest cell number.
The Cell Changer parameter can be stored along with all other parameter in the FILE MEMORY.

3.3.3 LAMBDA PROGRAM applies to SW Pack 1 and 3 (cont.)

Line 11:

Sipper volume	0.40 ml	0.10≤ ≤1.00

Active if a Peristaltic Sipper is connected.
Enter the desired sipper volume between 0.1 and 1 milliliter and press "enter".
Note: The sipping volume will depend upon the viscosity of the sample, the construction of the flow-through cell and the inner diameter of the filling tube.

Line 12:

Stabilizing time	3 sec	3 ≤ ≤ 10

Enter the desired stabilizing time between 3 and 10 seconds and press "enter".
Note: The stabilizing time will depend upon the viscosity of the sample. The time should be set so that there are no air bubbles in the cell when the measurement starts.

The peristaltic sipper parameters can be stored along with all other parameters in the FILE MEMORY.

Line 13+14:

Ratio 1	λ1/ λ2	1≤ ≤6 / 1≤ ≤6 off

Two ratios between two %T or abs values measured at any selected wavelength can be calculated. Ratio is coupled with lines 2-7. The measurement wavelength of an entered ratio has to be specified otherwise a combination error will occur.

Line 15+17:

Difference 1	λ1 - λ2

Two Differences between two %T or abs values measured at any selected wavelength can be calculated.
Difference is coupled with lines 2-7. The measurement wavelength of an entered ratio has to be specified otherwise a combination error will occur.

Line 16+18:

Factor diff 1	off	-9999 9999

Difference 1 and 2 can be multiplied with a factor if the selected working mode (Line 1) is abs.

Line 20:

Plotter mode	off	on off

Prints a result listing after each sample run. This is useful if many cycles are measured, or if an optional cell changer or the SAMPLER 99 is used.

3.3.3 LAMBDA PROGRAM applies to SW Pack 1 and 3 (cont.)

Line 21: Space

Line 22:

Spectral bandwidth	**2.0 nm**	**4 2 1 .5**

Only active if the instrument is equipped with the slit change mechanism otherwise: Space

Selects the spectral bandwidth of the instruments monochromator.

Line 23:

Lamp change	**340 nm**	**290≤ ≤400**

The lamp change defines which lamp has to be lit for the selected wavelength. An error is displayed if the required lamp is not lit.

Line 24:

H lamp	**on**	**on off**

A combination error is displayed if the H lamp is off for measurements in the visible region.

Line 25:

D2 lamp	**on**	**on off**

A combination error is displayed if the D2 lamp is off for measurements in the UV-region.

Line 26:

Baseline point	**off**	**on off**

A previously measured Baseline (UVISOFT KEY K3 RUN BASELINE) can be subtracted for every measurement wavelength. A combination error occurs if Baseline point is set on and no baseline has been stored.

Line 27:

Data to RS 232C	**off**	**on off**

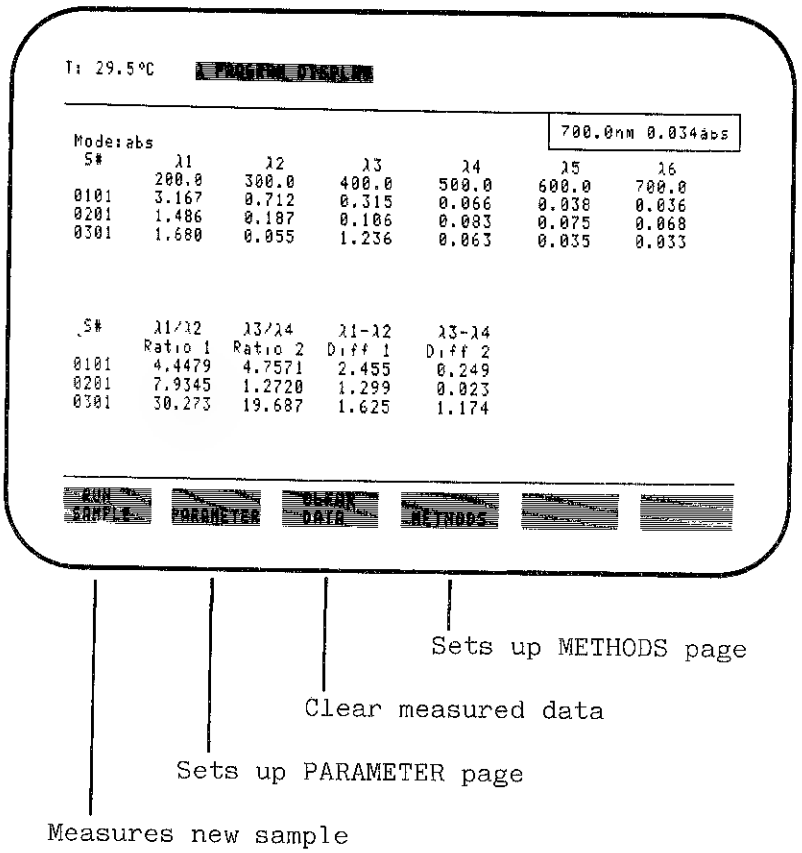
Activates transfer of measured data to a computer via RS 232C interface if on. The following output format is produced:

0202/ 0.054/ 0.053/ 0.054/ 0.053/ 0.053/ 0.054/ CR

Ratios and Difference are not transferred.

3.3.3 LAMBDA PROGRAM applies to SW Pack 1 and 3 (cont.)

The LAMBDA PROGRAM DISPLAY page



Sets up METHODS page

Clear measured data

Sets up PARAMETER page

Measures new sample

6 samples or cycles with the calculation results can be displayed on the screen. The seventh sample or cycle will clear the first line and write the values in this space. This continues until samples or cycles 1-6 are over-written with 7-12. Up to 99 measurements or cycles can still be printed by using the "hard copy" key if the P800 Printer/Plotter is connected.

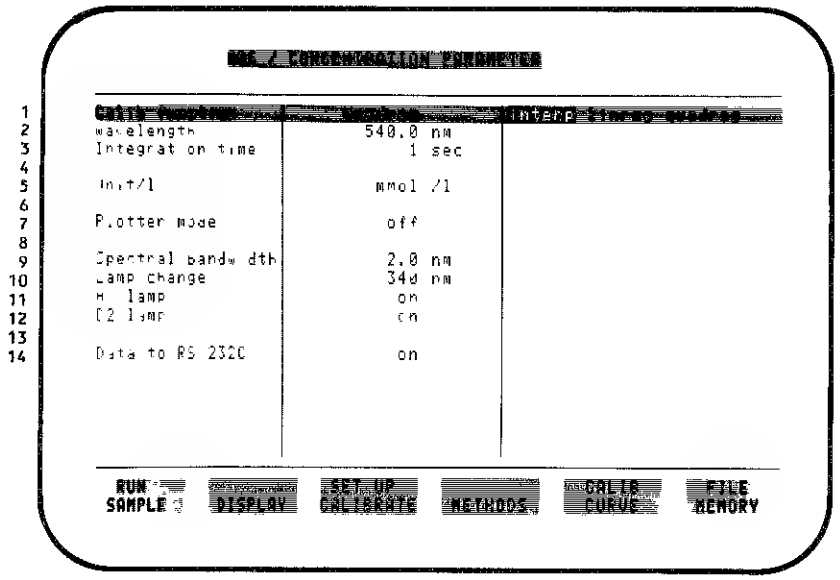
3.3.4 ABS / CONCENTRATION applies to SW Pack 1 and 3

The widely used method to determine the concentration of unknown samples is to relate their absorbance to a manually drawn calibration line (on graphical paper) using the absorbance and the known concentration values of standards.

UVIKON 860 simplifies this time consuming process with the ABS / CONCENTRATION method. Furthermore it provides more meaningful and accurate results by using mathematical functions for the calibration.

Three functions are available: Linear regression, linear interpolation and quadratic regression (for curved calibration lines).

The ABS / CONCENTRATION PARAMETER page



Sets up FILE MEMORY page to store parameter and calibration data

Shows calibration curve

Sets up METHODS page

Sets up ABS/CONCENTRATION CALIB page for measurement of up to 12 standards

Sets up ABS/CONCENTRATION RESULTS page. Previously measured data are always recalculated with the currently selected calib function

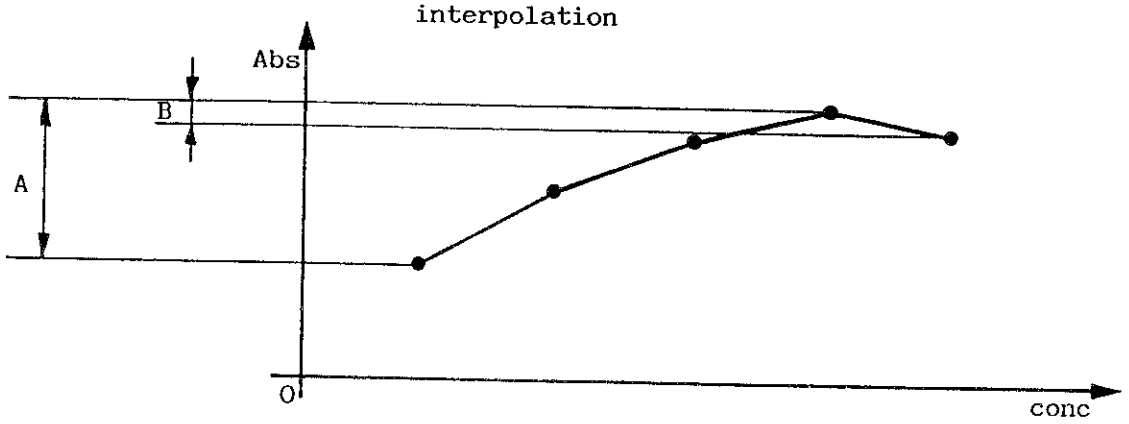
Sets up RESULTS page, measures a new sample and increments the sample number by 1.

3.3.4 ABS / CONCENTRATION applies to SW Pack 1 and 3 (cont.)

Line 1: **Calib function interp interp linreg quadreg**

Defines the Calibration function to be used on the measured calibration data. Different rules apply for calibration and measurement of the three functions.

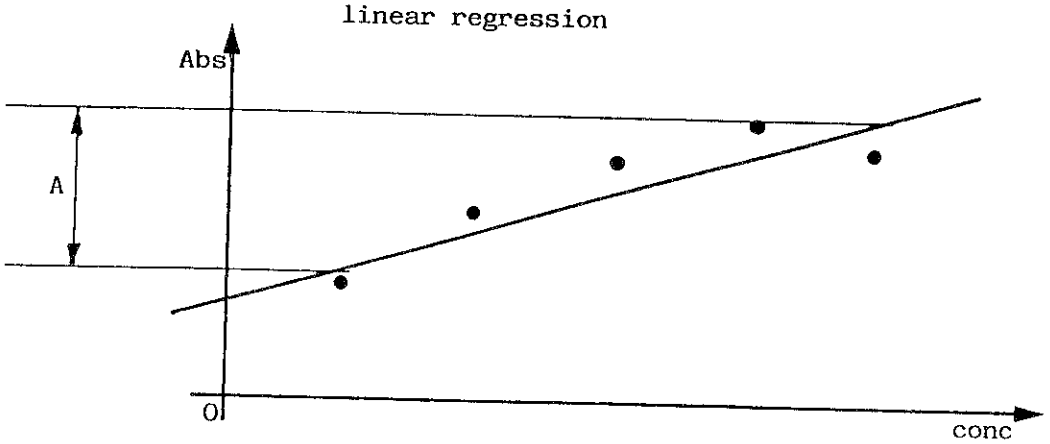
interpolation



The interpolation needs at least two calibration values. Fewer values produce the error messages CALIB VALUE MISSING.

Sample values outside the absorbance range A cannot be processed and produce the remark "range" on the RESULTS page.
Sample values within the absorbance range B are not defined and produce the remark "undef" on the RESULTS page.

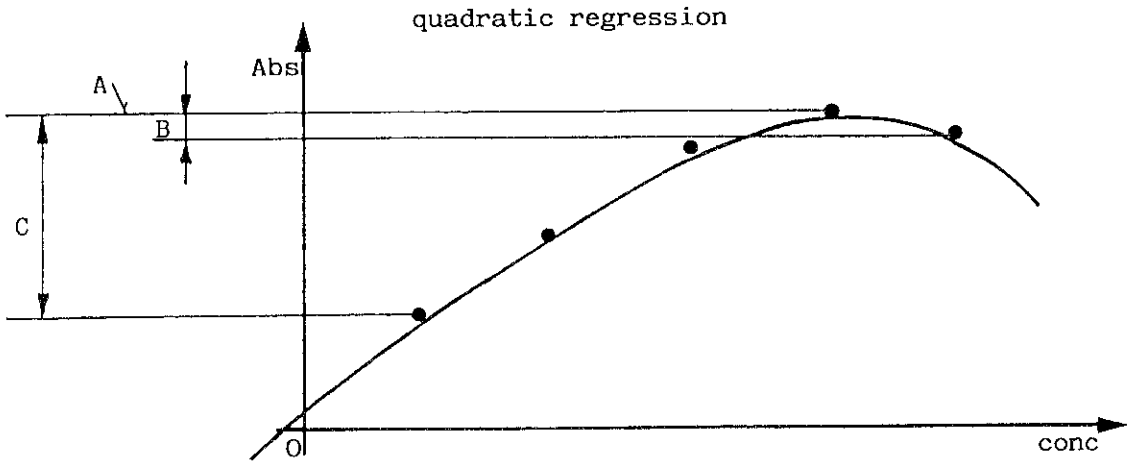
linear regression



The linear regression needs at least two calibration values. Fewer values produce the error message CALIB VALUE MISSING.

There is no limitation to the sample values that can be used for concentration calculation. You should however have your sample values within the absorbance range A to get safe results.

3.3.4 ABS / CONCENTRATION applies to SW Pack 1 and 3 (cont.)



The quadratic regression needs at least three calibration values. Fewer values produce the error message CALIB VALUE MISSING.

Sample values above the absorbance level A cannot be processed and produce the remark "undef" on the RESULTS page.

Sample values within the absorbance range B are not defined and produce the remark "undef" on the RESULTS page.

Although UVIKON 860 will process sample values below the absorbance range C, your sample values should remain within this range to obtain safe results.

Line 2:

Wavelength	**540.0 nm**	**180 ≤ ≤900**

Defines the measurement wavelength

Line 3:

Integration time	**1 sec**	**1≤ ≤60**

Longer integration time should be used when working in the high absorbance region to obtain averaged readings.

Line 4: Space

Line 5:

Unit / l	**off**	**g mg ug mol mmol umol off**

The selected concentration unit will be displayed on the RESULTS page and on a hard copy.

Line 6: Space

Line 7:

Plotter mode	**off**	**on off**

Prints a results listing after each sample run. This is useful if a Cell Changer or Sampler 99 is used.

3.3.4 ABS / CONCENTRATION applies to SW Pack 1 and 3 (cont.)

Line 8: Space

Line 9:

Spectral bandwidth	20 nm	4 2 1 .5

Selects the spectral bandwidth if the instrument is equipped with the optional slit change mechanism.

Line 10:

Lamp change	340 nm	290≤ ≤400

Lamp change defines which lamp has to be on for the selected wavelength. An error message is displayed if the required lamp is not lit. See Chapter 4.

Line 11:

H lamp	on	on off

An error messages is displayed if the H-lamp is off for measurements in the VIS-region. See chapter 4.

Line 12:

D2 lamp	on	on off

An error message is displayed if the D2-lamp is off for measurements in the UV-region. See chapter 4.

Line 13: Space

Line 14:

Data to RS 232 C	off	on off

All concentration results will be sent to an external computer if set "on".
The following data format is produced:

0101 1.0060 mmol/l CR

3.3.4 ABS / CONCENTRATION applies to SW Pack 1 and 3 (cont.)

Accessory Parameter

Parameters for Cell Changer and Peristaltic Sipper are inserted on Linie 5 and 6 if these accessories are connected. The parameters following will therefore have another line number.

Cell Changer

Line 5:

Cells to measure	1	1 2 3 4 5 6 delete

Any configuration of cells can be used.
Measurement will always start with the lowest cell number.
This parameter is not valid for the STANDARD RUN (see ABS / CONCENRATION CALIB page)

Peristaltic sipper

Line 5:

Sipper volume	0.40 ml	0.10 ≤ ≤ 1.00

Enter desired sipper volume

Line 6:

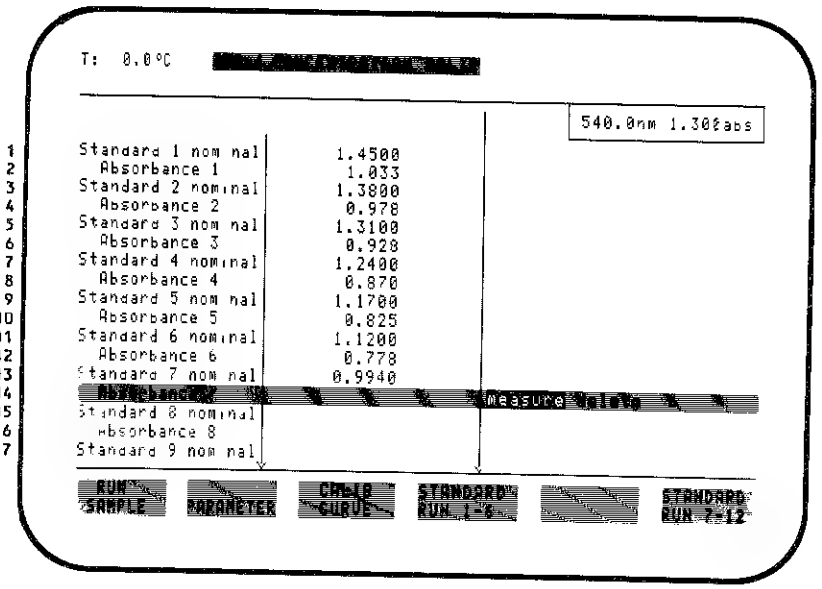
Stabilizing time	3 sec	3 ≤ ≤ 10

Defines the wait time before the actual measurement starts with the selected Integration time (Line 3).

3.3.4 ABS / CONCENTRATION applies to SW Pack 1 and 3 (cont.)

The ABS / CONCENTRATION CALIB page

All calibration data can be stored in a file and can be used for modification and recalculation any time. You can even use a different calibration on data already measured by changing calib data on this page or by using another calib function on the ABS / CENCENTRATION CALIB page.



Active if 7 or more standards are to be measured (second standard run with Cell Changer)

Active if one or more nominal values have been entered. (first standard run with Cell Changer)

Sets up CALIBRATION CURVE page to show the calculated calibration curve.

Sets up PARAMETER page

Sets up ABS / CONCENTRATION RESULTS page measures new sample and increments the sample number by 1.

3.3.4 ABS / CONCENTRATION applies to SW Pack 1 and 3 (cont.)

Line 1: **Standard 1 nominal** **-10000 < < 10000 del**

Enter the standard concentration of your standard 1. The calibration function is immediately recalculated if an existing value is overwritten.

Important: You cannot enter the same nominal value for two Standards (Combination error)

Line 2: **Absorbance 1** **measure delete**

Place the cursor on the word "measure" and press the "enter"-key to measure the absorbance value of the standard. The calibration function is immediately recalculated using the new value. Use "delete" - "enter" to remove the value from your calibration.

Lines 3-25: See line 1 and 2

Cell Changer and Peltier Cell Changer:

In additon to the normal operation during measurement (Parameter Cells to measure) the Cell Changer can also be used to measure up to 12 standards in 2 standard runs. Place your standards 1-6 into the Cell Changer / Standard 1 into the foremost position, standard 2 into the second position and so on).
Press UVISOFT key "STANDARD RUN 1-6" for the first standard run.
If you have more than 6 standards continue by placing standard 7 into the foremost position and so on.
Press UVISOFTKEY "STANDARD RUN 7-12" for the second standard run.

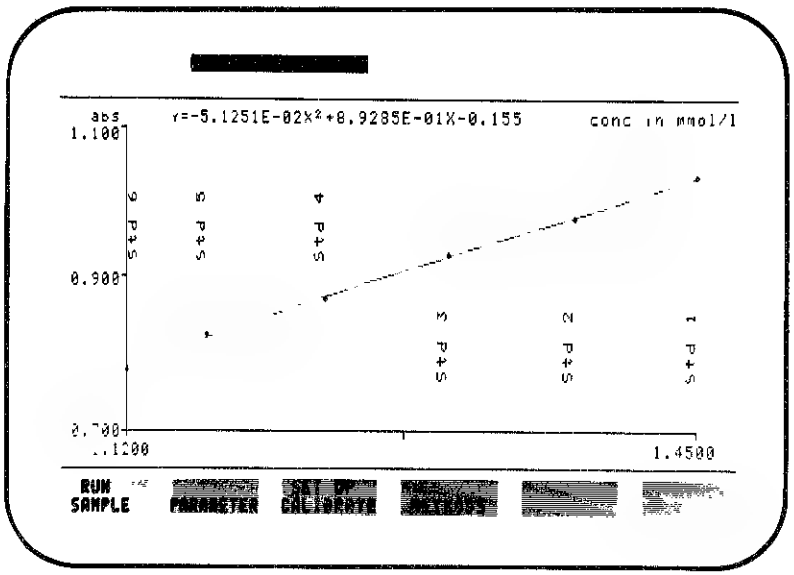
Peristaltic Sipper:

Enter "Measure" to start a standard run on the CALIBRATION page. The message PRESS "FILL" will be displayed. The standard run, can now be started via the sipper keyboard. To start a new measurement run always press "FILL" instead of "RUN SAMPLE". If UFISOFT key "RUN SAMPLE" is used then the previous sample will be measured again.

3.3.4 ABS / CONCENTRATION applies to SW Pack 1 and 3 (cont.)

The CALIBRATION CURVE page

This page is mainly used to check the quality of your calibration and the fit of the selected calibration function.



The calibration curve formula is shown when quadratic or linear regression is used.

Sets up METHODS page

Sets up ABS/CONCENTRATION CALIB page.
Modifications to the calib data will immediately be shown when returning to the curve display.

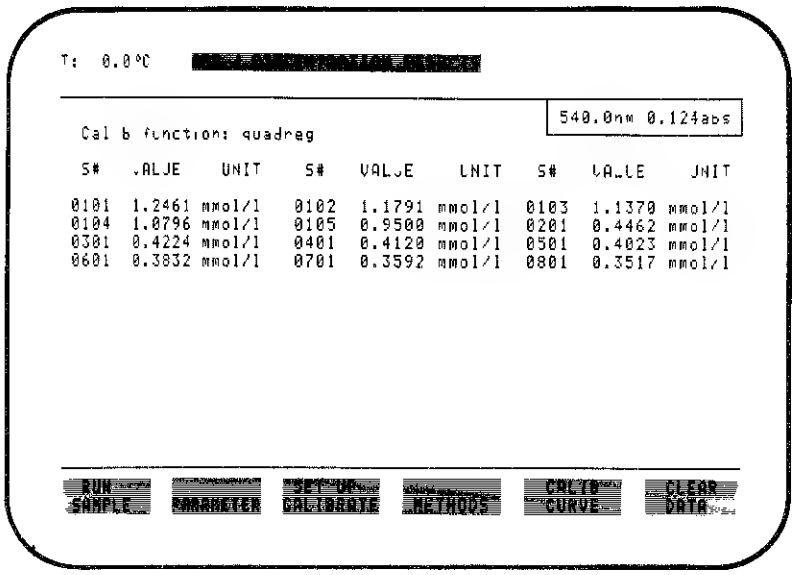
Sets up PARAMETER page

Sets up ABS/CONCENTRATION RESULTS page, measures new sample and increments the sample number by 1.

3.3.4 ABS / CONCENTRATION applies to SW Pack 1 and 3 (cont.)

The ABS / CONCENTRATION RESULTS page

Up to 42 values can be displayed on the screen. The older values are scrolled off the screen if more than 42 measurements are performed. All values (up to 99) can be printed on the P800 Printer/Plotter.



Clears the screen

Sets up CALIBRATION CURVE page

Sets up METHODS page

Sets up ABS/CONCENTRATION CALIB page

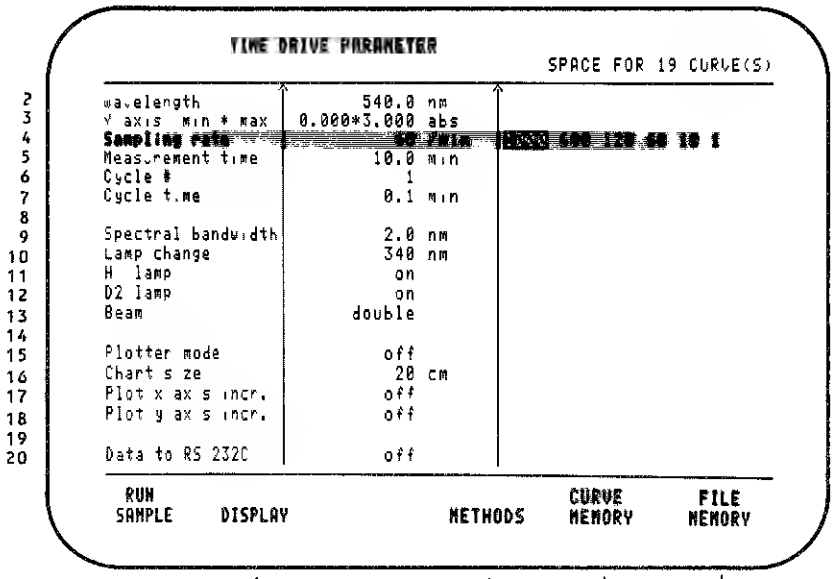
Sets up PARAMETER page

Measures a new sample and increments the sample number by 1.

The instrument may display "range" or "undef" in place of VALUE. In this case you have to check your calibration. See ABS/CONCENTRATION PARAMETER line 1 "Calib function"(Chapter 3, page 21).

3.3.5 **TIME DRIVE** applies to SW Pack 2 and 3

The TIME DRIVE PARAMETER page



Basic instrument configuration

Sets up FILE MEMORY page to store parameters

Sets up CURVE MEMORY page to protect, free or delete curves

Sets up METHODS page

Sets up DISPLAY page

Sets up DISPLAY page and measures new sample. Increments the sample number by 1.

3.3.5 TIME DRIVE applies to SW Pack 2 and 3 (cont.)

Line 1:

Mode	abs	abs %T

Defines the working mode absorbance or % transmittance.
The measurement Mode is coupled with line 3 "Y axis" and line 18 "Plot Y axis incr." The preset values or the last entered values in line 3 and 18 are automatically changed according to the selected mode.

Line 2:

Wavelength	580 nm	180≤	≤900

Defines the wavelength of the measurement.

Line 3:

Scale Y min * max	0.000*3.000 abs	-.3≤	≤4*-.3≤	≤4

It defines the minimum and maximum limits of the display range.
Y axis is coupled with line 1 "Mode". The preset values or the last entered values are automatically changed according to the selected mode.

Line 4:

Sampling rate	60 /min	1000 600 120 60 10 1

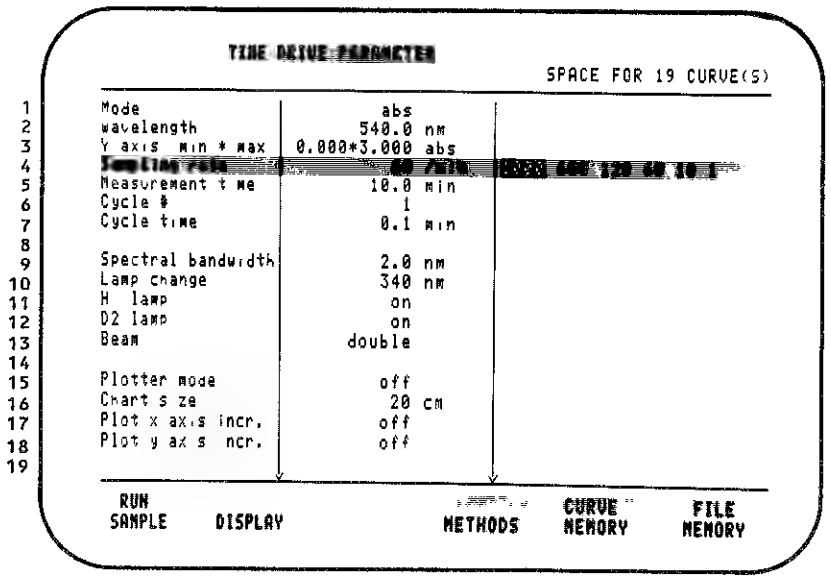
It defines the number of measurements in 1 minute.
The Sampling rate is coupled with line 5 "measurement time", line 6 "Cycle number" and line 22 "Cells to measure" if a cell changer is connected.
The available curve memory space is displayed in the message section when parameters are entered on this line. See chapter 2.10.1 for calculation of available curve memory space.
Use high sampling rate for sharp peaks and low sampling rate for low noise.

Line 5:

Measurement time	10.0 min	0≤	≤9999

It defines the duration of measuring.
The measurement time is coupled with line 4 "Sampling rate", line 6 "Cycle number" and line 22 "Cells to measure" if a cell changer is connected. A combination error occurs if more than one cycle was entered on line 6 and the cycle time is shorter than the measurement time.
The available curve memory space is displayed in the message section when parameters are entered on this line.

3.3.5 **TIME DRIVE** applies to SW Pack 2 and 3 (cont.)



Line 6:

Cycle #	1	1≤	≤99

To automatically repeat the measurement, select the number of measurements desired.
The cycle number is coupled with line 4 "Sampling rate", line 5 "Measurement time" and line 22 "Cells to measure" if a cell changer is connected.
The available curve memory space is displayed in the message section when parameters are entered on this line.

Line 7:

Cycle time	0.1	0≤	≤9999

Selects the time interval between measurement repetitions.
A combination error occurs if more than one cycle was entered on line 6 and the cycle time is shorter than the measurement time.

Line 8: Space

3.3.5 TIME DRIVE applies to SW Pack 2 and 3 (cont.)

Line 9:

Spectral bandwidth	2 nm	4 2 1 .5

Selects the spectral bandwidth if the instrument is equipped with the optional slit change mechanism, otherwise a space appears instead of this line.

Line 10:

Lamp change	340 nm	290≤ ≤400

The lamp change defines which lamp has to be on for the selected wavelength. An error message is displayed if the required lamp is not lit. See chapter 4.

Line 11:

H lamp	on	on off

The H-lamp has to be on for measurements in the visible region.

Line 12:

D2 lamp	on	on off

The D2-lamp has to be on for measurements in the UV region.

Line 13:

Beam	double	double single

Selects the working mode double or single beam.
If "single" is entered an auto zero is measured at the current wavelength (line 2 "Wavelength") and displayed in the message section.

Line 14: Space

Line 15:

Plotter mode	off	serial overlay off

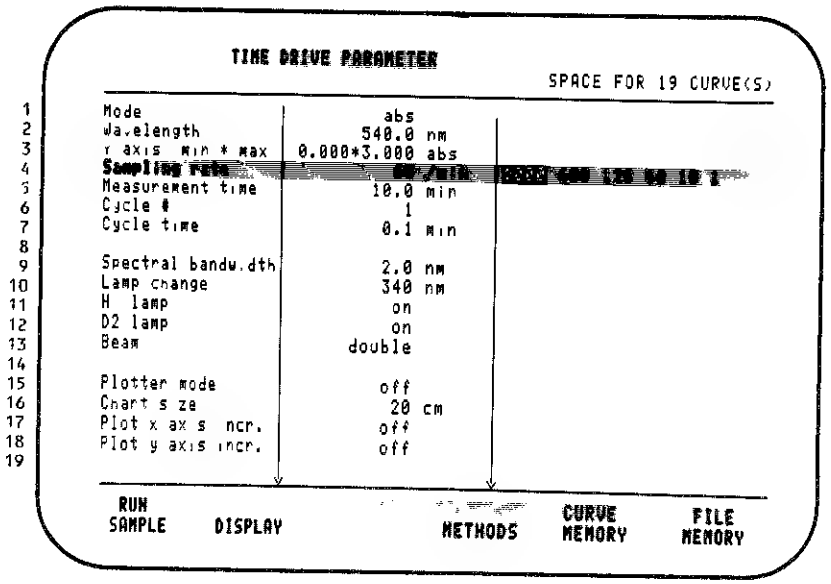
Serial or overlay drawings of curves are available after each measurement if the optional Printer/Plotter is connected.

Line 16:

Chart size	20 cm	5≤ ≤150

The chart size defines the length of the curve on the plot.

3.3.5 TIME DRIVE applies to SW Pack 2 and 3 (cont.)



Line 17:

Plot X axis incr.	off	50 20 10 5 1 .5 .1 off

Plot X axis incr. defines the interval (space) between each grid line on the X axis plot. Unit is nanometers.

Line 18:

Plot Y axis incr.	off	1 .5 .1 .05 .01 .005 off

Plot Y axis incr. defines the interval (space) between each grid line on the Y axis plot. The values are automatically changed when the mode is changed on line 1. Unit is depending on chosen mode, abs or %T.

Line 19: Space

Line 20:

Data to RS 232C	off	on off

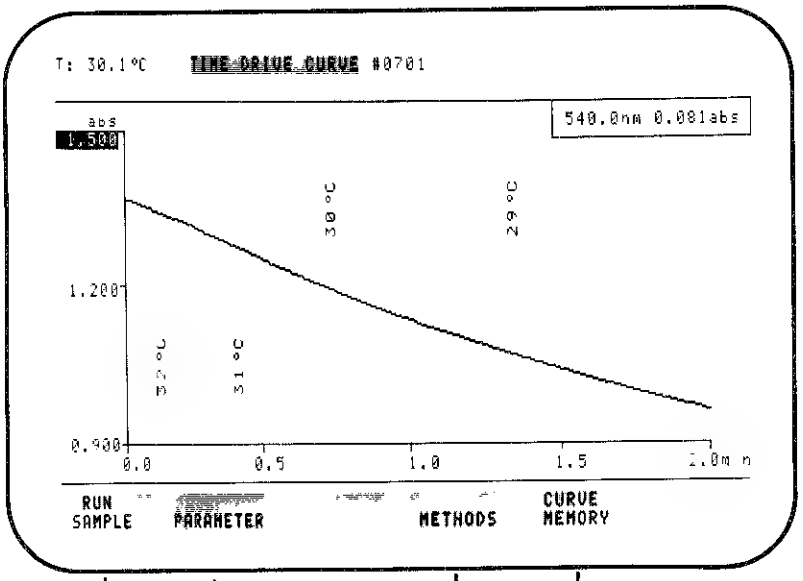
Activates transfer of measured data to computer via RS 232C interface if on.

3.3.5 TIME DRIVE applies to SW Pack 2 and 3 (cont.)

The TIME DRIVE DISPLAY page

Absorbance versus temperatur measurements can be made if an optional temperature sensor is connected.
The starting temperature and temperature changes of 1 degree celsius are written onto the curve.

Example: A measurement starts at 30°C and ends at 40°C. You will get 11 temperature readouts on the screen starting with 30°C and ending with 40°C in steps of 1° degree celsius.
The Printer/Plotter additionally prints the time of every temperature step.
Only the last curve will show temperatures when you are working with cycles.



The curve can be expanded or compressed without losing temperatur information by changing the Y axis min/max or X axis min/max values on the screen.

Sets up CURVE MEMORY page

Sets up METHODS page

Sets up PARAMETER page

Measures new sample and increments the sample number by 1.

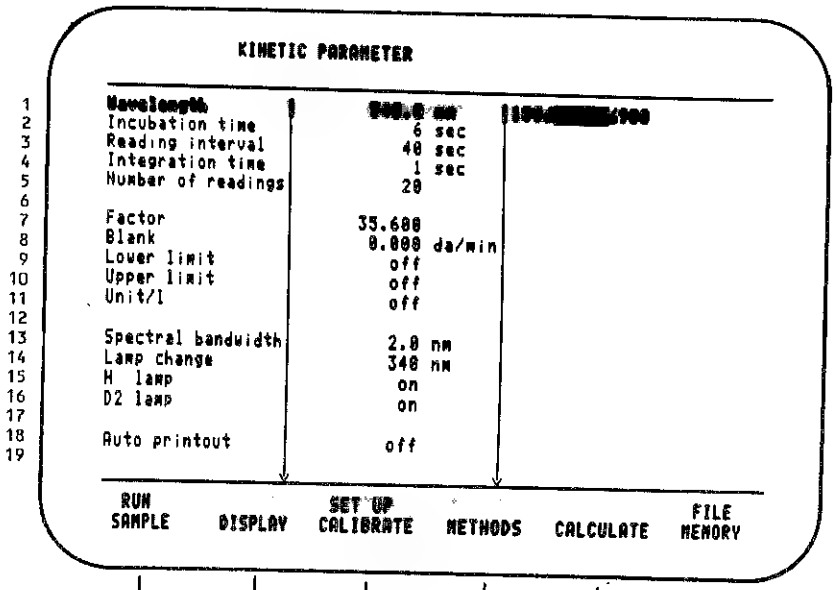
Any wavelength can be entered via the [λ] key when the measurement

is completed. Use the [down] [up] keys for manual scanning.

3.3.6 KINETICS applies to SW Pack 2 and 3

Instructions are also given for the optional Cell Changer, Peltier Cell Changer and Peristaltic Sipper.

The KINETIC PARAMETER page



Sets up FILE MEMORY page to store parameters

Sets up KINETIC CALCULATION page

Sets up METHODS page

Sets up KINETIC CALIBRATION page to measure blank and up to 6 Standards

Sets up DISPLAY page. The readings of the last measurement are displayed

Sets up DISPLAY page and measures new sample. Increments the sample number by 1.

3.3.6 KINETICS applies to SW Pack 2 and 3 (cont.)

Line 1:

Wavelength	540.0 nm	180≤ ..... ≤900

Defines the measurement wavelength.

Line 2:

Incubation time	0 sec	0≤ .... ≤9999

Defines the delay time after RUN SAMPLE until the first reading is taken.
Peristaltic Sipper: The minimal Incubation time is 3 sec.

Line 3:

Reading interval	5 sec	1≤ .... ≤9999

Defines the delay time between two readings on the same cell.
Cell Changer: minimal Reading interval =
# of Cells * (Integration time + 2 sec)

Line 4:

Integration time	1 sec	1≤ .. ≤60

Longer integration time should be used when working in the high absorbance region to obtain averaged readings.

Line 5:

Number of readings	20	3≤ .. ≤30

Use as many readings as possible to get precise results. Low number of readings should only be used for fast reactions.

Line 6: Space

Line 7:

Factor	1.00	-9999≤ ..... ≤9999

The Activity (Act.) is calculated by multiplying the slope of the regression line(a) with the Factor (F) Act.= a * F. The Factor can be entered manually on the PARAMETER page or it can be calculated using STANDARD measurement on the CALIBRATION page. The Factor will be stored automatically as a parameter when it is calculated on the CALIBRATION page.

3.3.6 KINETICS applies to SW Pack 2 and 3 (cont.)

Line 8:

Blank	0.0000da/min	-9.9999 ..... 9.9999

The slope of the Blank regression line(a_b) is always subtracted from the reaction. Act. = $(a - a_{blank}) * F$

The Blank can be entered manually on the PARAMETER page or it can be measured on the CALIBRATION page using "measure" Blank. The Blank will be stored automatically as a parameter when it is measured on the CALIBRATION page.

Line 9:

Lower limit	off	-9999≤..... ≤9999 off

The message LIMIT "Low" will be displayed on the CALCULATION page and printed on the results output if the activity lies below the Lower limit.

Line 10:

Upper limit	off	-9999≤..... ≤9999 off

The message LIMIT "High" will be displayed on the CALCULATION page and printed on the results output if the activity exceeds the upper limit.

Line 11:

Unit /l	off	U mkat µkat nkat off

The selected activity unit will be displayed on the CALCULATION page and on the results output.

1 katal (kat) = 1 mol/s
1 U = 1 umol/min = 16.7 nkat = 16.7 nmol/s

Line 12: Space

Line 13:

Spectral bandwidth	2.0 nm	4 2 1 .5

Selects the spectral bandwidth if the instrument is equipped with the optional slit change mechanism, otherwise a space appears instead of this line.

3.3.6 KINETICS applies to SW Pack 2 and 3 (cont.)

Line 14:

Lamp change	340 nm	290≤	≤400

Lamp change defines which lamp has to be on for the selected wavelength. An error message is displayed if the required lamp is not lit. See chapter 4.

Line 15:

H lamp	on	on off

An error message is displayed if the H-lamp is off for measurements in the VIS-region. See chapter 4.

Line 16:

D2 lamp	on	on off

An error message is displayed if the D2-lamp is off for measurements in the UV-region. See chapter 4.

Line 17: Space

Line 18:

Auto printout	off	abs activity off

If Auto printout "abs" is selected: All readings will be printed on the P800 Printer/Plotter.
If Auto printout "activity" is selected, the following pattern will be printed on the P800 Printer/Plotter:

SAMPLE # READINGS ACTIVITY SD CD LIMIT

Line 19: Space

Line 20:

Data to RS 232 C	off	on off

All readings will be transferred to a computer if set "on".
The following data format is produced:

0101 0.163 CR

Line 21: Space

3.3.6 KINETICS applies to SW Pack 2 and 3 (cont.)

Cell Changer:

Line 22:

Cells to measure	1	1 2 3 4 5 6 delete

Any configuration of cells can be used.
This line is coupled with line 3 "Reading interval". A combination error occurs, if the selected number of cells is too big for the entered Reading interval.
This parameter is also valid for the STANDARD RUN on the CALIBRATION page. The related standard will be inserted on the CALIBRATION page and will produce a combination error. The error is cleared after the selected standard has been measured.

Peltier Cell Changer:

Line 22:

Cells to measure	1	1 2 3 4 5 6 delete

Same instructions as for the Cell Changer.
Exception: The minimal Reading interval must be longer.

Line 23:

Blank in Cell 1	off	on off

The Peltier Cell Changer has no thermostatted reference Cell holder. The blank is measured simultanously and subtracted from every reading if Blank in Cell 1 is set "on". Use only Cell 1 for the blank.

Peristaltic Sipper:

Line 22:

Sipper volume	0.40 ml	0.10≤....≤1.00

Enter desired sipper volume

Line 23:

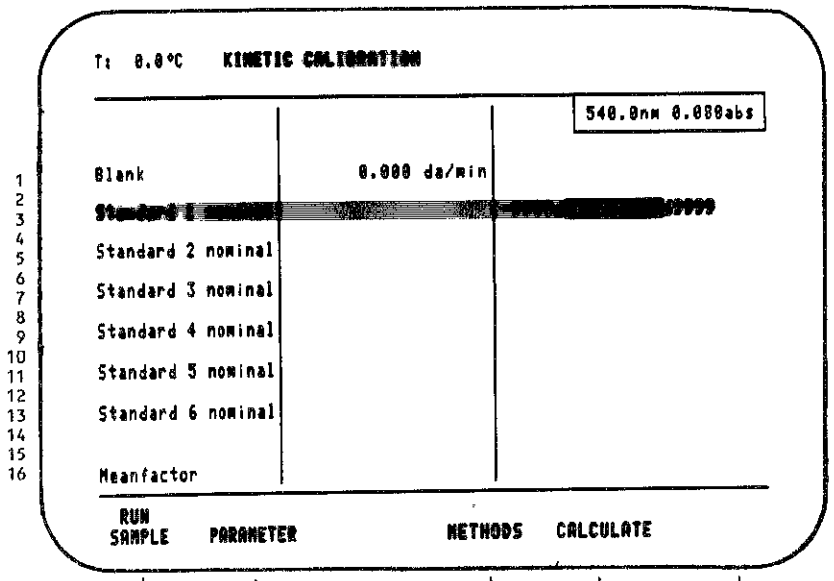
Stabilizing time	3 sec	3≤ .. ≤10

The Stabilizing time runs parallel with the incubation time (line 2). The minimal Incubation time is therefore 3 sec if the Peristaltic sipper is used.

3.3.6 KINETICS applies to SW Pack 2 and 3 (cont.)

The KINETIC CALIBRATION page

The blank has to be entered or measured before a standard-run is carried out, because the same blank is used for the standards. The blank line is locked after the first standard has been measured.



Only active if Cell Changer is connected
up to 6 Standards can be measured simultanously

Sets up KINETIC CALCULATION page

Sets up METHODS page

Sets up PARAMETER PAGE

Sets up DISPLAY page and measures new sample. Increments the sample number by 1.

The nominal values are deleted when the CALIBRATION page is left. Blank and Mean factor will be copied into the PARAMETER page and can be stored into the FILE MEMORY together with all other KINETIC parameters.

3.3.6 KINETICS applies to SW Pack 2 and 3 (cont.)

Line 1: **Blank** **0.000 da/min** **measure delete**

Press "enter" to measure the blank. All measurement parameters are used for the blank. The blank can be checked like all samples on the CALCULATION page. The sample number of the blank is "BL". The activity of the blank is always 0.000. The blank value is automatically stored on the parameter page.

Line 2: Space

Line 3: **Standard 1 nominal** **-9999.....9999**

Enter the nominal activity of the standard.
The instrument will insert line 4: Factor 1

Line 4: **Factor 1** **measure delete**

This line is inserted after the nominal activity of standard 1 has been entered.
Press "enter" to measure standard 1. All measurement parameters are used for the standard. The standard can be checked like all samples on the CALCULATION page. The sample number of standard 1 is "S1".

Line 5-14: See line 3 and line 4

Line 15: Space

Line 16: **Mean factor**

The Mean factor is the mean value of up to 6 Factors. Anyone of the 6 Factors can be deleted or a new standard-run can be carried out. Every modification will start a new calculation of the Mean factor. The Factor is automatically stored on the parameter page.

3.3.6 KINETICS applies to SW Pack 2 and 3 (cont.)

Cell Changer and Peltier Cell Changer:

The first selected Cell number will always be used for the blank run.

The Cell Changer can be used to measure up to 6 Standards in one run.

The Cells have to be selected on the PARAMETER page. The related standards on the CALIBRATION page will be inverted and the nominal values can be entered. If all nominal values are entered, the combination error will clear and the UVISOFT key "RUN STANDARD" will be activated.

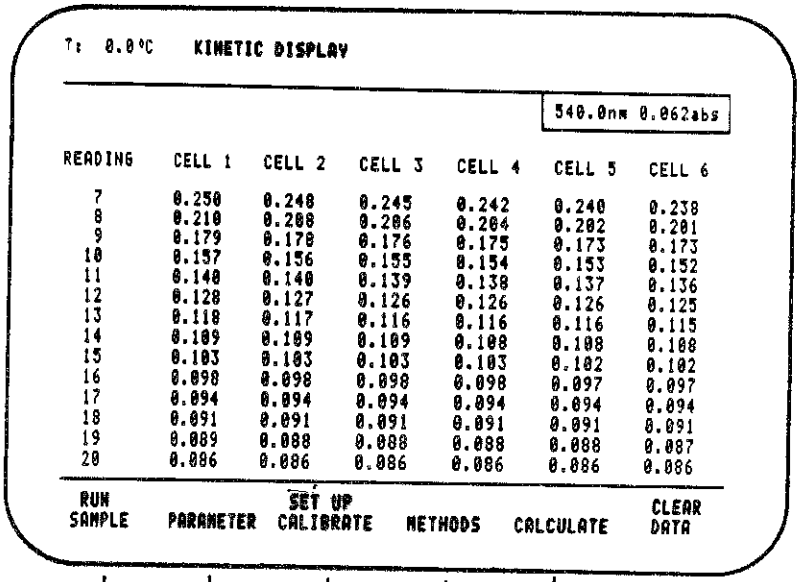
Peristaltic Sipper:

Enter "Measure" to start a blank - or a standard run on the CALIBRATION page. The message PRESS "FILL" will be displayed. The blank - or standard run can now be started via the sipper keyboard. To start a new KINETIC run always press "FILL". If UVISOFT key "RUN SAMPLE" is used then the previous sample will be measured again.

3.3.6 KINETICS applies to SW Pack 2 and 3 (cont.)

The KINETIC DISPLAY page

The KINETIC DISPLAY page is shown during a RUN or it can be selected from the PARAMETER- or CALCULATION page.
This page cannot be hardcopied.
Use the parameter Auto printout "abs" or the UVISOFT key "LIST VALUES" to get a hardcopy of all readings.



Clears the screen

Sets up CALCULATION page

Sets up METHODS page

Sets up CALIBRATION page to measure blank and up to 6 Standards

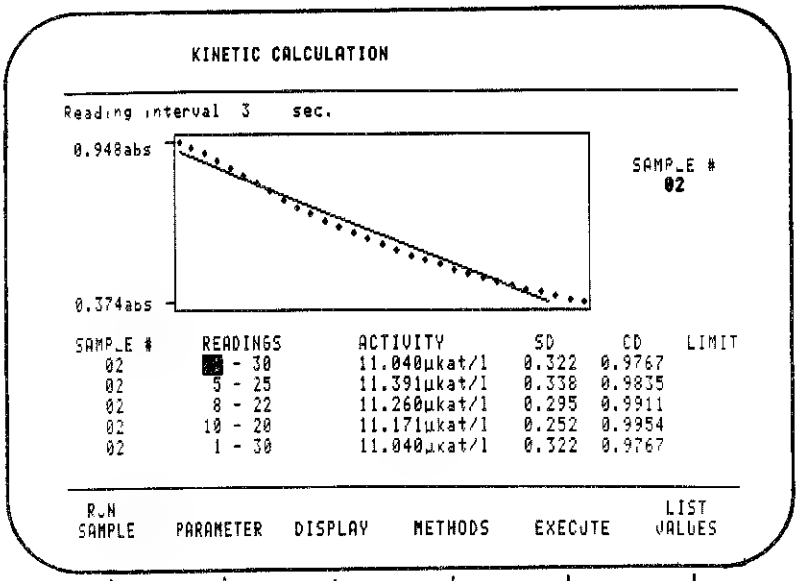
Sets up PARAMETER page

Measures new sample. Increments the sample number by 1.

3.3.6 KINETICS applies to SW Pack 2 and 3 (cont.)

The KINETIC CALCULATION page

The graph on this page shows the linear regression for the readings of one sample.
The readings used for the calculation of the linear regression can be reduced. Enter the desired reading for start and end of the regression and press "enter". Press UVISOFT key "EXECUTE" to recalculate regression line.



Select the desired Sample number and press "enter". (only active when Cell Changer is used)

Lists all readings and da/min values on the P800 Printer/Plotter

Recalculates linear regression

Sets up METHODS page

Sets up DISPLAY page

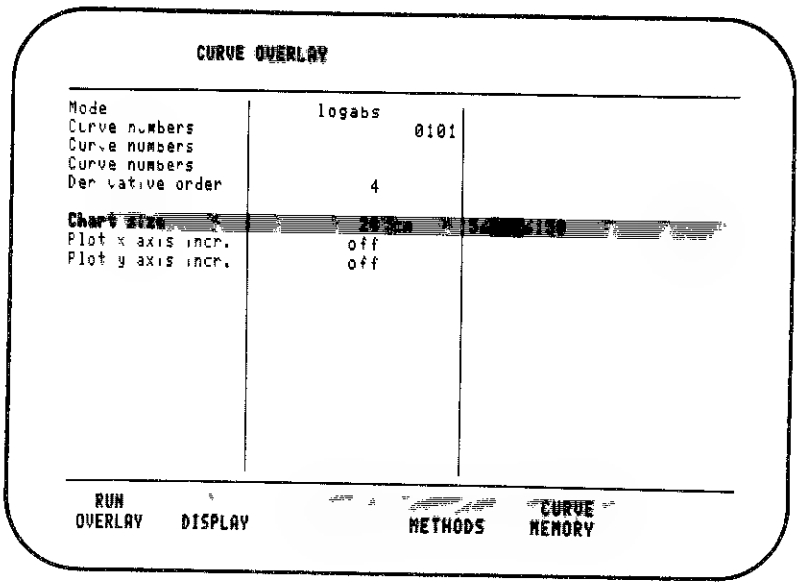
Sets up PARAMETER page

Sets up DISPLAY page. Measures new sample and increments the sample number by 1.

3.3.7 CURVE OVERLAY applies to SW Pack 1, 2 and 3

The CURVE OVERLAY method is used to display up to 12 stored curves of the same derivative order simultaneously on the screen.
The X and Y axis min/max values are calculated by the instrument to match the largest curve. The curves can be expanded or compressed on the display page.

The CURVE OVERLAY PARAMETER page



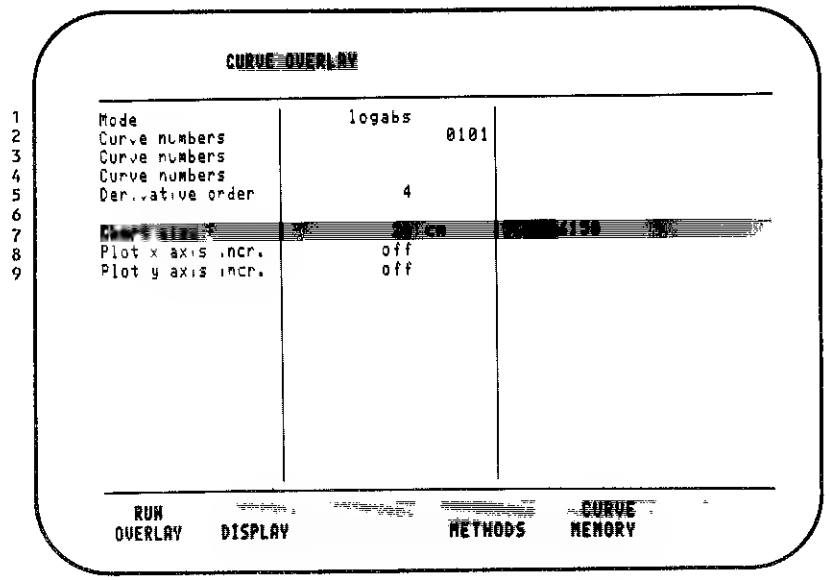
Sets up CURVE MEMORY PAGE

Sets up METHODS page

Sets up DISPLAY page

Calculates and displays the selected curves

3.3.7 CURVE OVERLAY applies to SW Pack 1, 2 and 3 (cont.)



Line 1: **Mode** **abs** **abs %T** **logabs**

Curves can be displayed in any of the three modes. Different methods (e.g. SCAN combined with TIME DRIVE) cannot be displayed together.

Line 2: **Curve numbers** **0101 0102 0103 0105 0101≤** **≤9999 delete**

Line 3: **Curve numbers** **0201 0202 0501 0101≤** **≤9999 delete**

Line 4: **Curve numbers** **0101≤** **≤9999 delete**

Up to 4 curve numbers can be entred on each line.
"delete" clears all curve numbers entered on the current line.

Up to 12 curves, corresponding to the numbers entred on line 2, 3 and 4 can be displayed simultaneously.

Line 5: **Derivative order** **0 1 2 3 4**

All curves are displayed in the selected derivative order.

3.3.7 **CURVE OVERLAY** applies to SW Pack 1, 2 and 3 (cont.)

Line 6: Space

Line 7:

Chart size	**20 cm**	**5≤**	**≤150**

The chart size defines the length of the curve on the plot.

Line 8:

Plot x axis incr.	**off**	**100 50 20 10 5 2 1 off**

Plot X axis incr. defines the interval (space) between each grid line on the X axis plot. Unit is nanometers.

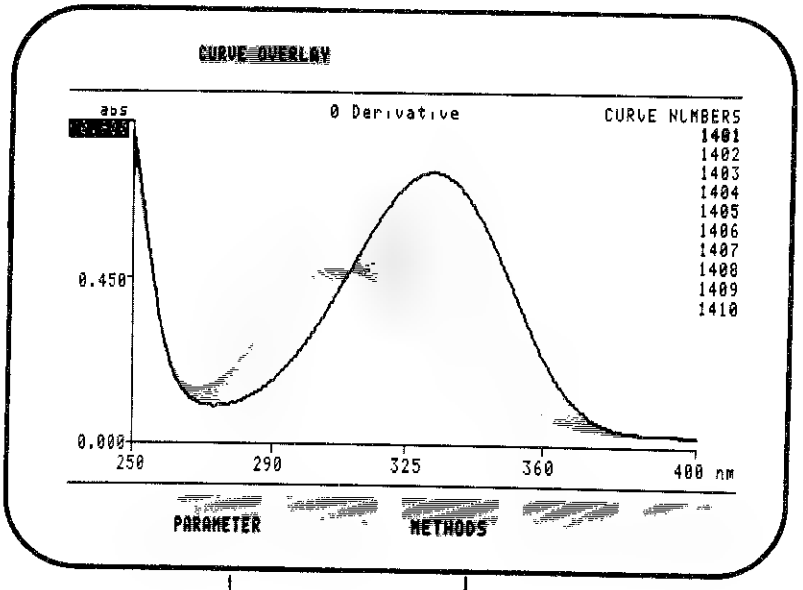
Line 9:

Plot y axis incr.	**off**	**.5 .2 .1 .05.02.01 off**

Plot Y axis incr. defines the interval (space) between each grid line on the Y axis plot. The values are automatically changed when the mode is changed on line 1. Unit is depending on chosen mode, abs or %T.

The CURVE OVERLAY DISPLAY page

One curve can be selected to be displayed brighter than the others. Select the curve number of the curve you want to see. Move the cursor to the desired curve number on the rigth side of the screen and press "enter".



Expand or compress all displayed curves by changing Y axis min/max or X axis min/max values on the screen.

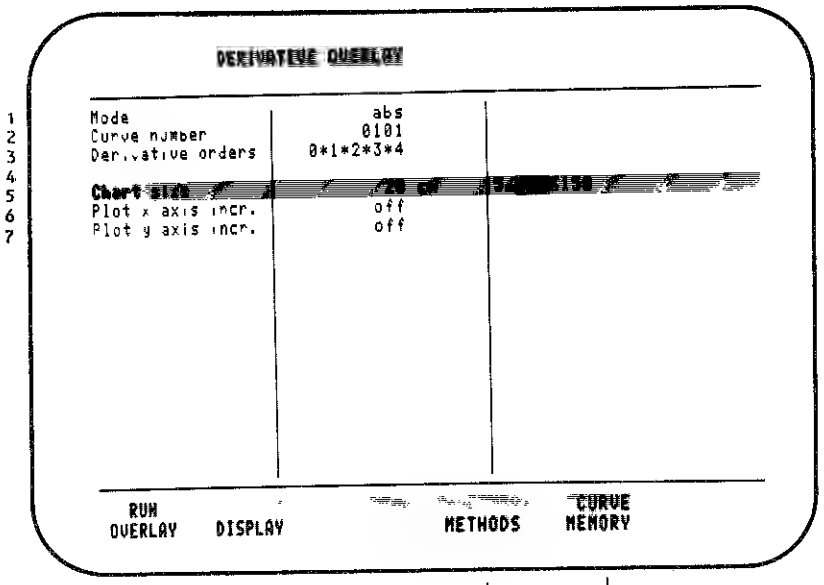
Sets up METHODS page

Sets up PARAMETER page

3.3.8 **DERIVATIVE OVERLAY** applies to SW Pack 1, 2 and 3

The DERIVATIVE OVERLAY method is used to display the 0 to 4th derivative of a curve simultaneously on the screen.
The X and Y axis min/max values are calculated by the instrument to match the largest derivative. Every curve can be expanded or compressed separately.

The DERIVATIVE OVERLAY PARAMETER page



Sets up CURVE MEMORY page

Sets up METHODS page

Sets up DISPLAY page

Calculates and displays the entered derivatives of the selected curves.

3.3.8 DERIVATIVE OVERLAY applies to SW Pack 1, 2 and 3 (cont.)

Line 1:

Mode	abs	abs %T

The instrument can calculate derivatives in both modes.

Line 2:

Curve number	0101	0101≤	≤9999

Selects the curve to be used.
Derivatives can be calculated from SCAN or TIME DRIVE curves. Only one curve can be entered.

Line 3:

Derivative orders	0 1	0 1 2 3 4

Defines in which derivative orders the curves will be shown.
Any combination of derivative orders is possible.

Line 4: Space

Line 5:

Chart size	20 cm	5≤	≤150

The chart size defines the length of the curve on the plot.

Line 6:

Plot x axis incr.	off	100 50 20 10 5 2 1 off

Plot X axis incr. defines the interval (space) between each grid line on the X axis plot. Unit is nanometers.

Line 7:

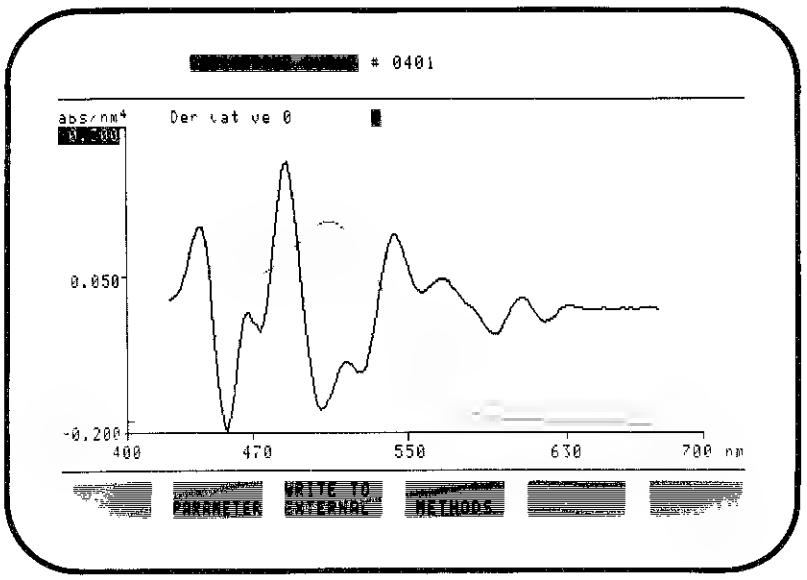
Plot y axis incr.	off	.5 .2 .1 .05.02.01 off

Plot Y axis incr. defines the interval (space) between each grid line on the Y axis plot. The values are automatically changed when the mode is changed on line 1. Unit is depending on chosen mode, abs or %T.

3.3.8 **DERIVATIVE OVERLAY** applies to SW Pack 1, 2 and 3 (cont.)

The DERIVATIVE OVERLAY DISPLAY page

The display of every derivative can be expanded or compressed separately. Move the cursor to the derivative order you want to modify and press "enter". The selected derivative will be displayed brighter than the others. Now you can modify the position and size of the curve by changing Y-scale with cursor and numerical keys.



Sets up METHODS page

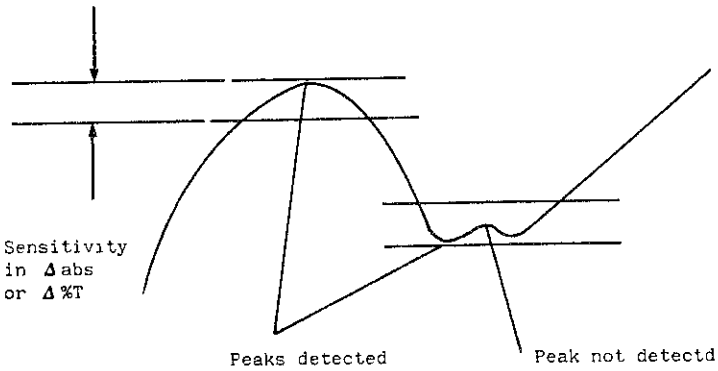
Derivative of the selected curve is sent to an external computer via the RS 232 interface. See chapter 3.6

Sets up PARAMETER page

3.3.9 **PEAK DETECTION** applies to SW Pack 1, 2 and 3

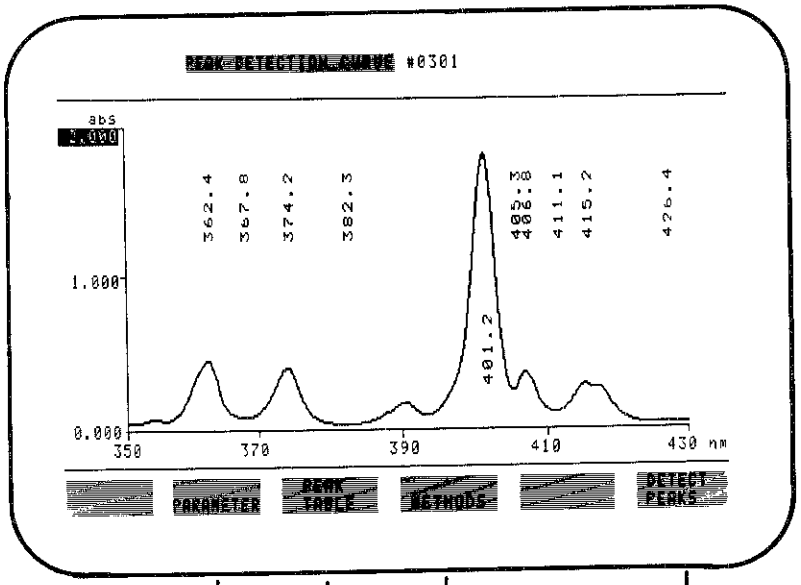
PEAK DETECTION can be calculated for a selected curve from the curve memory. You can choose between a peak listing or a curve with marked peaks.

Peaks can be detected on SCAN and TIME DRIVE curves.



Low sensitivity values will detect smaller peaks

The PEAK DETECTION Display page



Use the cursor to expand or compress the displayed curve

Detects peaks for displayed curve

Sets up METHODS page

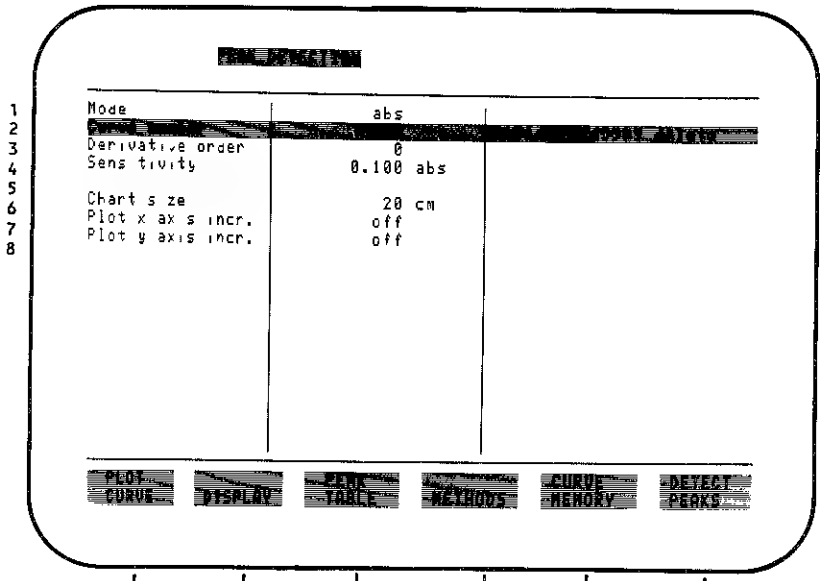
Shows peak table for displayed curve

Sets up PARAMETER page

The plotter (P800) prints wavelength and abs or %T value of each peak if "hard copy" is used.

3.3.9 **PEAK DETECTION** applies to SW Pack 1, 2 and 3 (cont.)

The PEAK DETECTION PARAMETER page



Detects peaks for the new curve and sets up peak table

Sets up CURVE MEMORY page

Sets up METHODS page

Shows peak table for the previous curve

Sets up DISPLAY page with previous curve

Sets up DISPLAY page and plots new curve

3.3.9 PEAK DETECTION applies to SW Pack 1, 2 and 3 (cont.)

Line 1:

Mode	abs	abs %T

The instrument can calculate derivatives in both modes.

Line 2:

Curve number		0101≤	≤9999 delete

Selects the curve to be used.

Line 3:

Derivative order	0	0 1 2 3 4

Defines the derivative order of the curve.

Line 4:

Sensitivity	0.250 abs	0<	≤4.000

Defines the band for detection (see also figure).

Line 5: Space

Line 6:

Chart size	20 cm	5≤	≤150

The chart size defines the length of the curve on the plot.

Line 7:

Plot x axis incr.	off	100 50 20 10 5 2 1 off

Plot X axis incr. defines the interval (space) between each grid line on the X axis plot. Unit is nanometers.

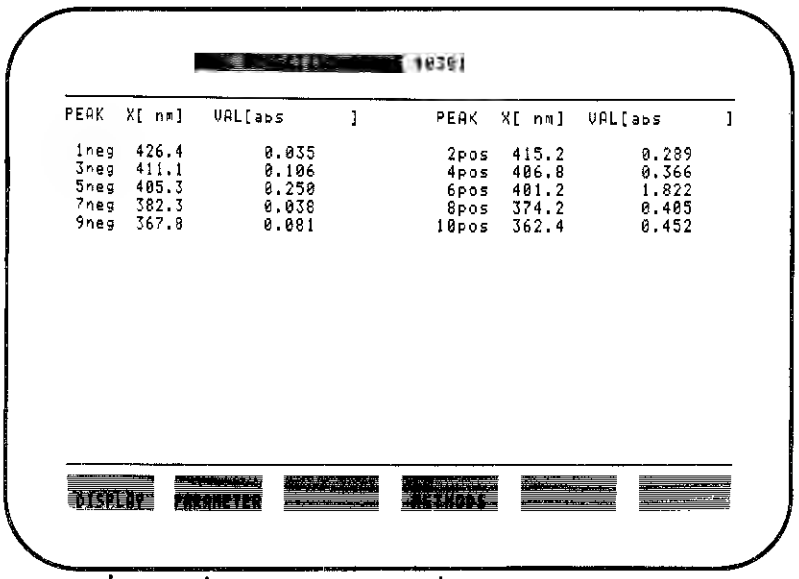
Line 8:

Plot y axis incr.	off	.5 .2 .1 .05.02.01 off

Plot Y axis incr. defines the interval (space) between each grid line on the Y axis plot. The values are automatically changed when the mode is changed on line 1. Unit is depending on chosen mode, abs or %T.

3.3.9 **PEAK DETECTION** applies to SW Pack 1, 2 and 3 (cont.)

The PEAK DETECTION LISTING page



Sets up METHODS page

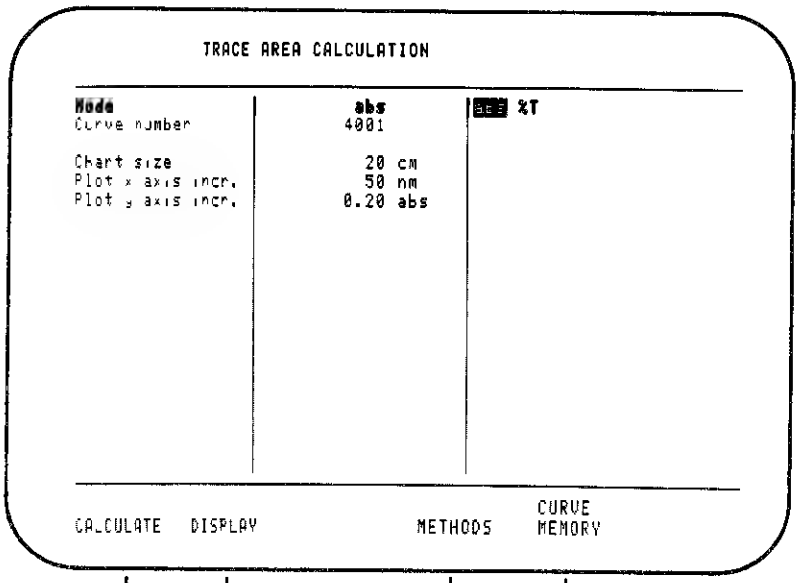
Sets up PARAMETER page

Displays selected curve. Up to 32 peaks can be listed.

3.3.10 TRACE AND AREA CALCULATION applies to SW Pack 3

The TRACE AREA PARAMETER page

Two cursors can be used to read abs or %T values of SCAN or TIME DRIVE curves. The area underneath the curve is calculated between the two cursors. The displayed area and y-axis values always refer to the part of the curve on the screen.



Sets up CURVE MEMORY page

Sets up METHODS page

Displays curve if already calculated

Calculates and displays selected curve.

3.3.10 TRACE AND AREA CALCULATION applies to SW Pack 3 (cont.)

Line 1:

Mode	%T	abs %T

Both modes can be used

Line 2:

Curve number	0101	0101≤....≤9999 delete

Selects the curve to be used.

Line 3: Space

Line 4:

Chart size	20cm	5≤ ≤150

The chart size defines the length of the curve on the plot.

Line 5:

Plot x axis incr.	off	100 50 20 10 5 2 1 off

Plot X axis incr. defines the interval (space) between each grid line on the X axis plot. Unit is nanometers or minutes.

Line 6:

Plot y axis incr.	off	.5 .2 .1 .05.02.01 off

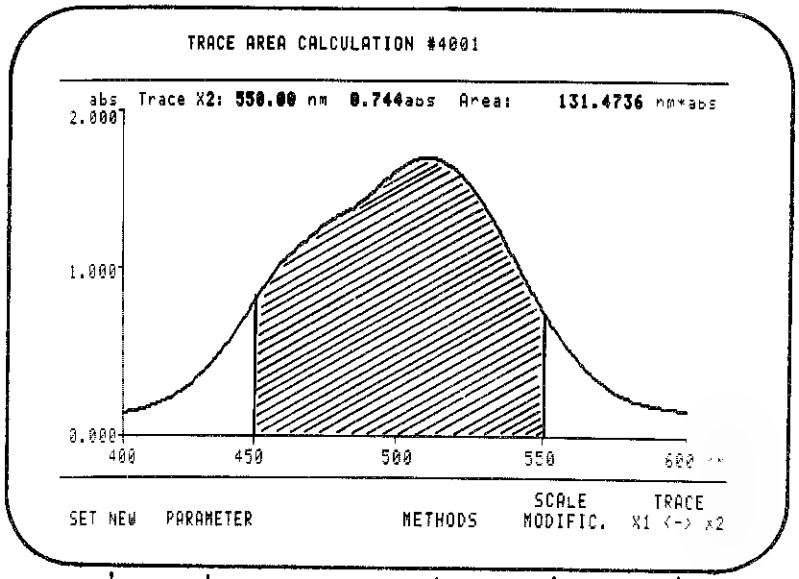
Plot Y axis incr. defines the interval (space) between each grid line on the Y axis plot. The values are automatically changed when the mode is changed on line 1. Unit is depending on chosen mode, abs or %T.

3.3.10 TRACE AND AREA CALCULATION applies to SW Pack 3 (cont.)

The TRACE AREA Display page

The cursor keys have two functions on this page:

1. Scale Modification as used in all other methods
2. Moving the TRACE cursor X1 or X2 along the x-axis on the screen.



The Y-axis value of the active TRACE cursor and the area under the curve between X1 and X2 are displayed on the first line.

Activates TRACE mode of cursor keys or switches X1 to X2 or X2 to X1.

Activates Scale modification mode of cursor keys.

Sets up METHODS page

Sets up PARAMETER page

Moves TRACE cursors back to start position.

3.3.10 TRACE AND AREA CALCULATION applies to SW Pack 3 (cont.)

The cursor keys are always in the scale modification mode after the page has been set up.

Press UVISOFT key K6 to activate the TRACE mode of the cursor keys.

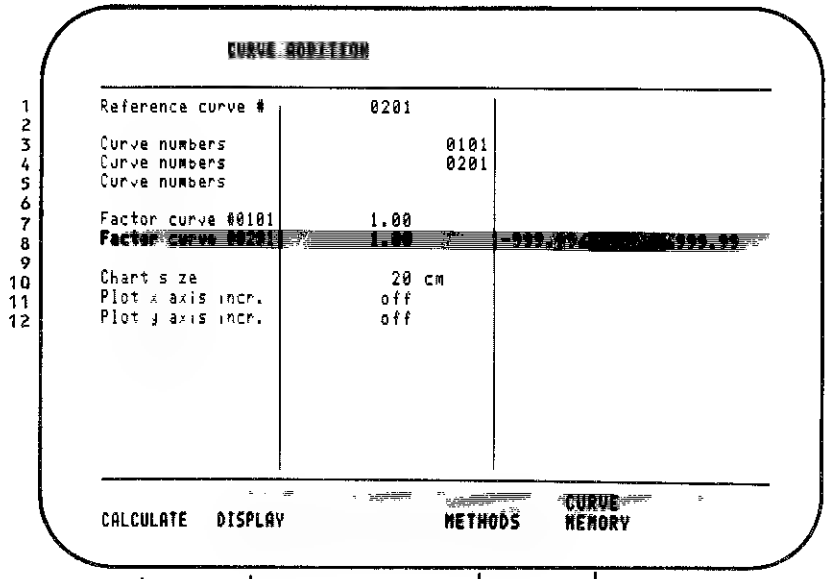
The cursor keys  can now be used to move the TRACE cursors X1 and X2 along the X-axis.

Press UVISOFT key K6 again to switch from X1 to X2 or from X2 to X1. Keep the cursor key pressed for contineous movement of the TRACE cursor. The Y-axis value and the area are calculated and displayed on the first line of the input/output section every time the cursor key is released.

3.3.11 CURVE ADDITION applies to SW Pack 3

The CURVE ADDITION method is used to add, subtract or multiply curves. You can mix up to twelve stored curves. Every curve can be multiplied with a factor between -999.99 and +999.99. One stored curve is displayed as reference.

The CURVE ADDITION Parameter page



Sets up CURVE MEMORY page

Sets up METHODS page

Displays curves if already calculated, else same function as CALCULATE

Calculates and displays curves

Line 1: **Reference curve #** **0101≤** **≤9999 delete**

The reference curve will be displayed with an independent scale.

Line 2,6,9: Space

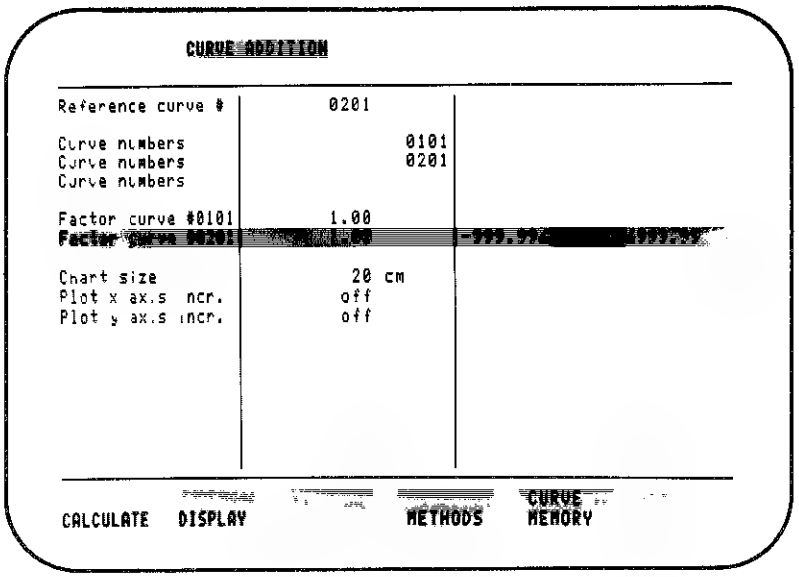
Line 3,4,5: **Curve numbers** **0201 0202 0501 0101≤** **≤9999 delete**

Up to 12 curves corresponding to the numbers entred on line 3,4 and 5 can be added.

Line 7+8: **Factor curve #0101** **1.00** **-999.99≤** **≤999.99**

The curve will be multiplied with the entered factor.

3.3.11 CURVE ADDITION applies to SW Pack 3 (cont.)



Line 10:

Chart size	20 cm	5≤	≤150

The chart size defines the length of the curve on the plot.

Line 11:

Plot x axis incr.	off	100 50 20 10 5 2 1 off

Plot X axis incr. defines the interval (space) between each grid line on the X axis plot. Unit is nanometers.

Line 12:

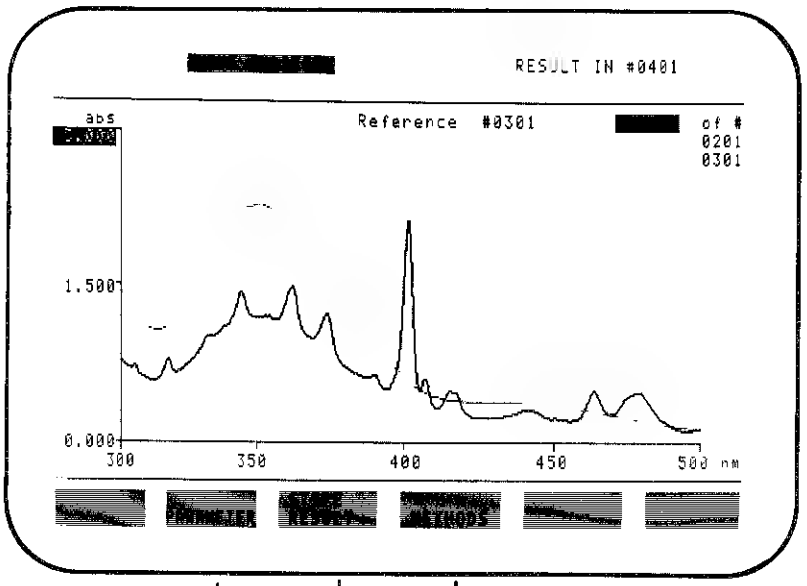
Plot y axis incr.	off	.5 .2 .1 .05.02.01 off

Plot Y axis incr. defines the interval (space) between each grid line on the Y axis plot. The values are automatically changed when the mode is changed on line 1. Unit is depending on chosen mode, abs or %T.

3.3.11 CURVE ADDITION applies to SW Pack 3 (cont.)

The CURVE ADDITION display page

Move the cursor to "Reference" or "Result" and press "enter" for high intensity display.



Expand or compress the bright curve by changing Y axis min/max or X axis min/max values on the screen.

Sets up METHODS page

Stores result curve into the curve memory

Sets up PARAMETER page

STORE RESULT

Result curves can be stored into the curve memory as they are shown on the screen.
The result curve can be a mixture of up to 12 samples. Expand or compress the result curve as you like and then press UVISOFT-key K3 STORE RESULT. The curve number of the new curve now stored in the curve memory will be displayed in the message section of the screen.

The stored curve can be used like all other curves for further calculation with all calculation methods.
This feature is also very useful to reduce the size of a curve to save memory space or to reduce processing time in the calculation methods.

Absorbance values higher than 10 abs cannot be stored in the curve memory.

Reduced time drive curves will always be displayed starting from 0 minutes.

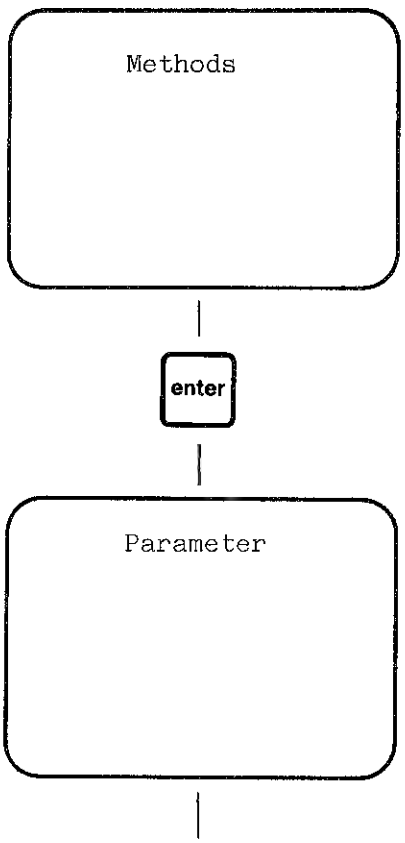
3.4 MEASUREMENT EXAMPLES

3.4.1 λ-SCAN

Example with following parameters:

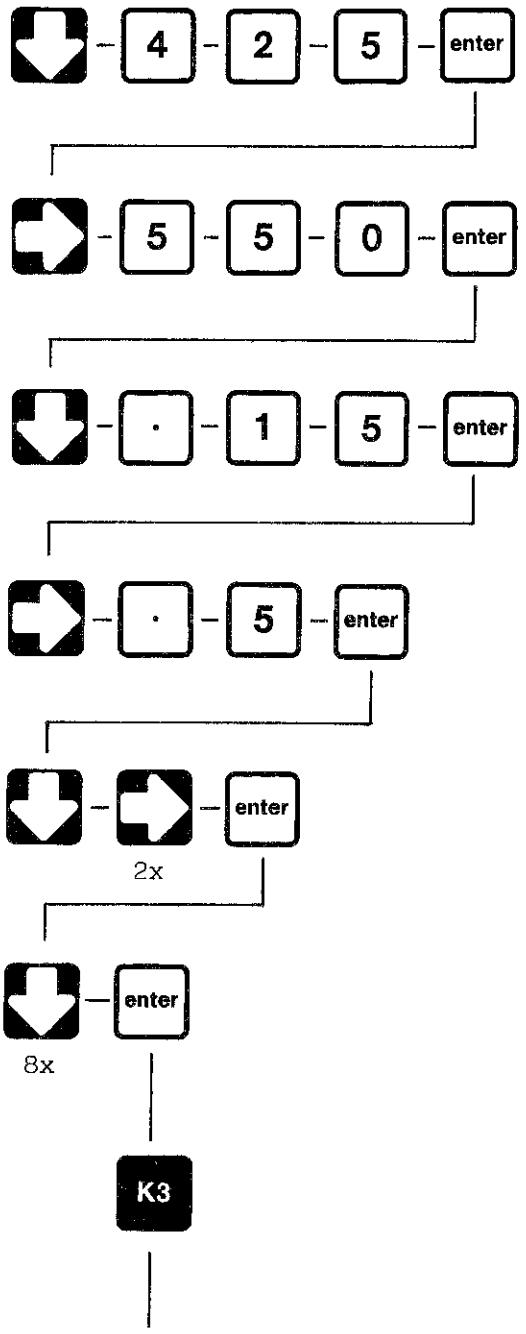
X axis	425 - 550 nm
Y axis	0.15 - 0.5 abs
Sampling interval	0.5 nm
Baseline correction	on

The preset values are used for all other parameters

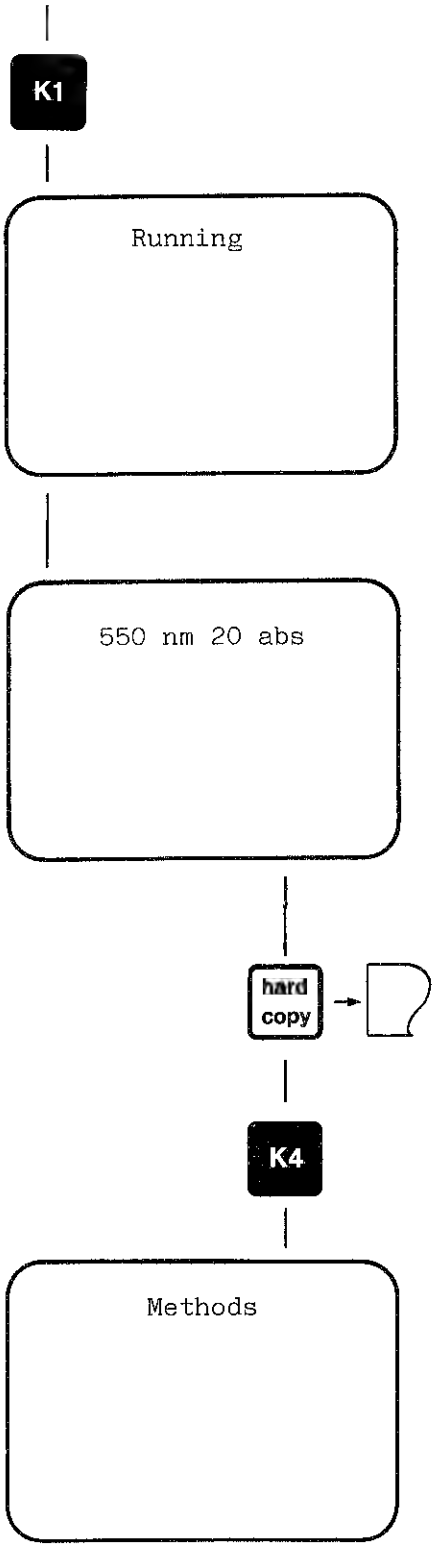


- Start with METHODS page after switching on and completed self test
- Selected λ-Scan mode with cursor

3.4.1 λ-SCAN (cont.)



3.4.1 λ-SCAN (cont.)



- Run sample

- The scan takes about 1.25 min. The parameters can be checked during measurement with UVISOFT key K2 PARAMETER VIEW.

- The curve can be expanded or compressed by changing the X axis- and Y axis min/max values on the screen.

- The "hard copy" takes about 1 min

- METHODS

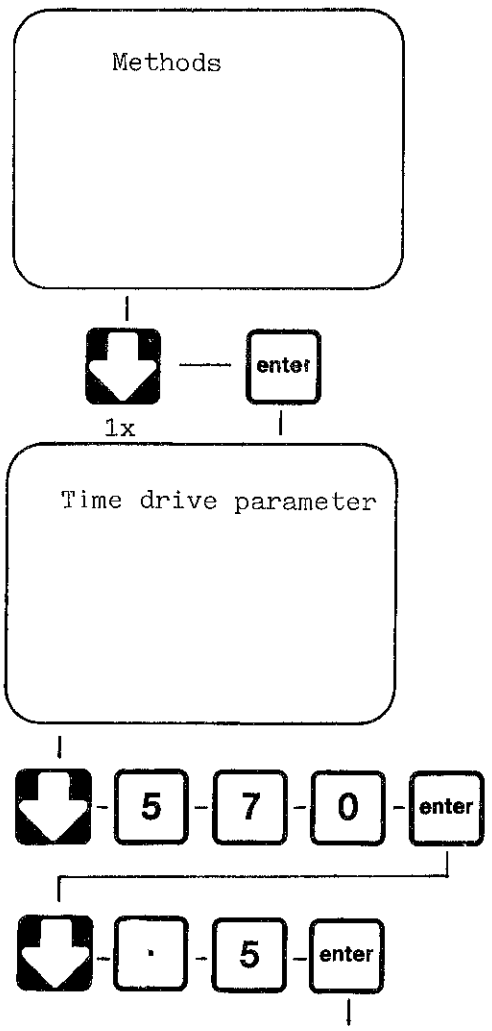
- The instrument is ready for another method

3.4.2 TIME DRIVE

Example with following parameters

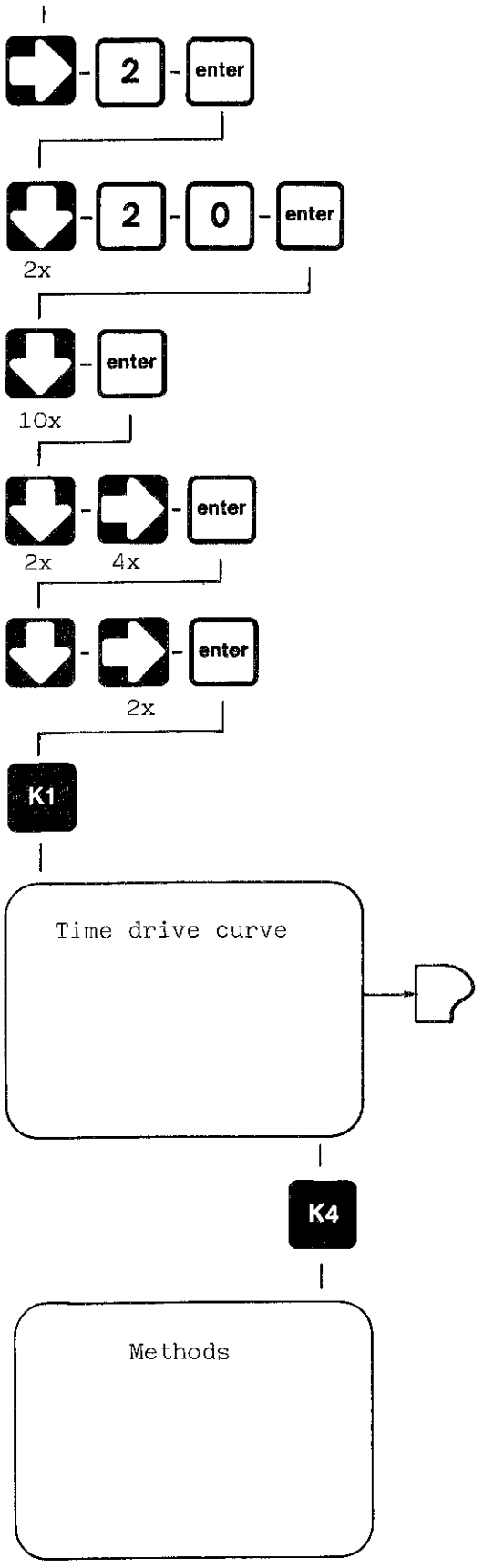
Wavelength	570 nm
Y axis min * max	0.5 * 2 abs
Measurement time	20 min
Plotter mode	serial
Plot x axis incr.	1 min
Plot Y axis incr.	0.1 abs

The preset values are used for all other parameters



- Start with METHODS after switching on and completed self test
- TIME DRIVE
- Wavelength
- Y axis min

3.4.2 TIME DRIVE (cont.)



- Y axis max

- Measurement time

- Plotter mode serial

- Plot X axis incr.

- Plot Y axis incr.

- RUN SAMPLE

- METHODS

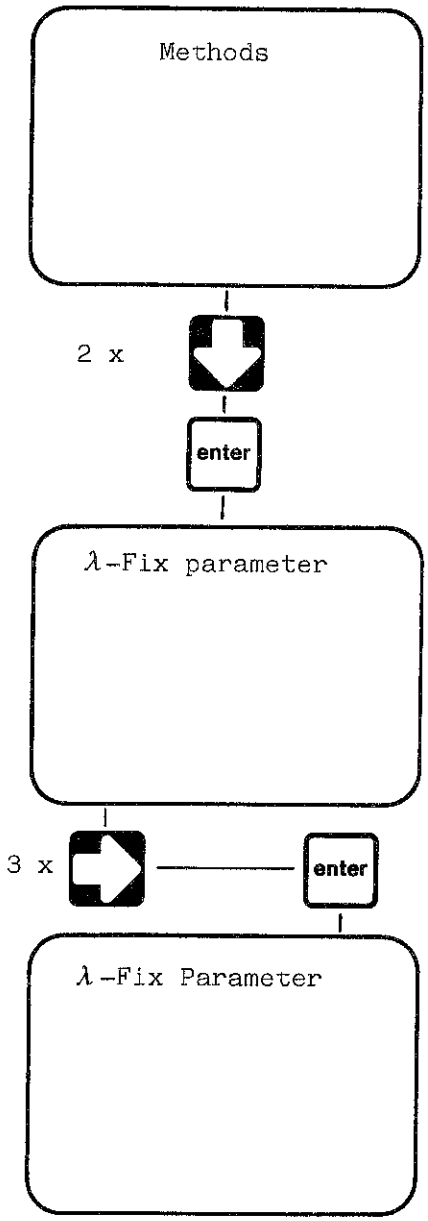
- The instrument is ready for another method.

3.4.3 λ-FIX

Example with following parameters

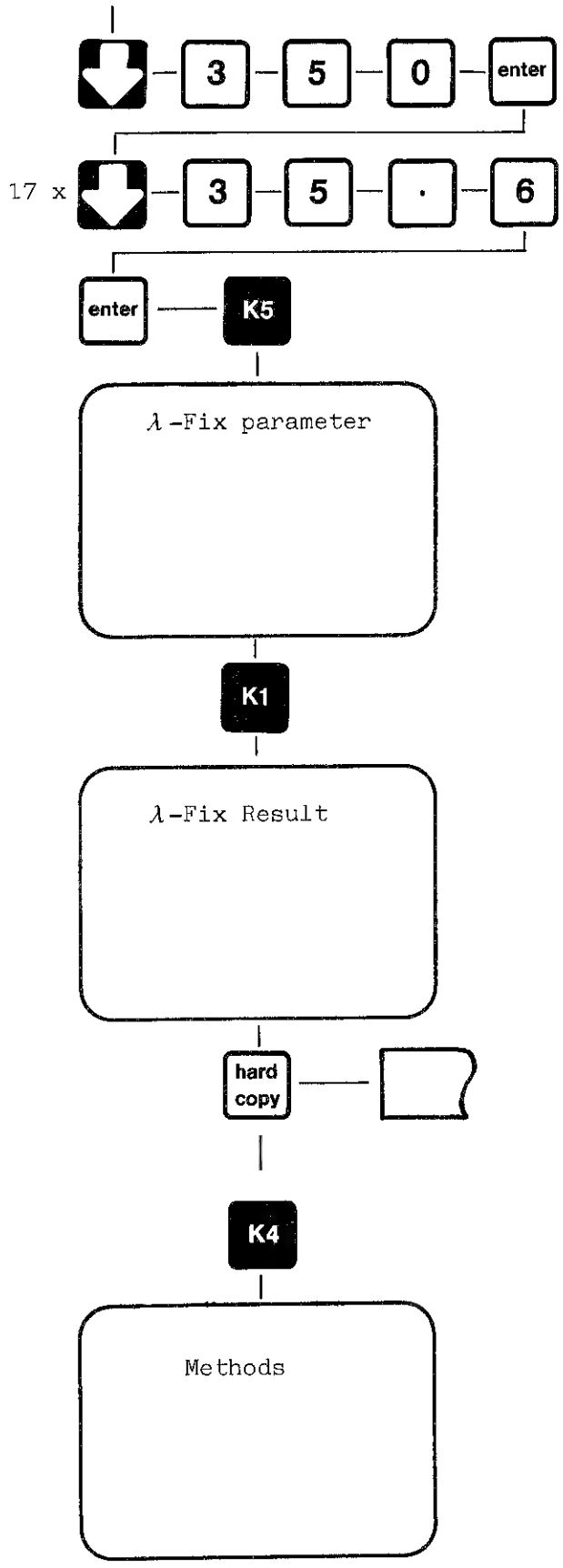
Mode	conc.
Wavelength	350 nm
Standard conc.	35.6

The preset values are used for all other parameters



- Start with METHODS page after switching on and completed self test
- λ-FIX
- conc.
- Lines 17-19 are added.

3.4.3 λ-FIX (cont.)



- Wavelength
- Standard conc.
- MEASURE STANDARD
- The conc. factor is calculated and entered on line 18.
- RUN SAMPLE
- METHODS
- The instrument is ready for another method.

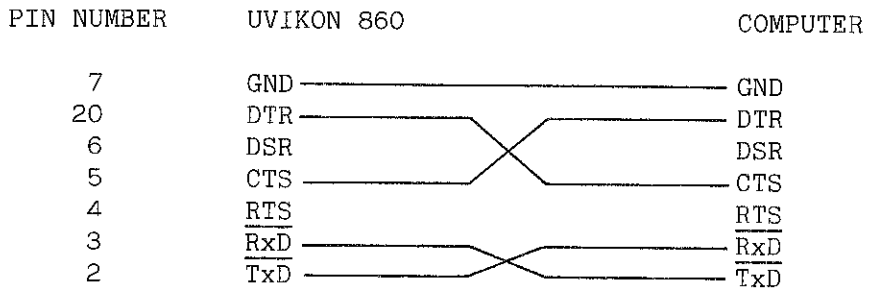
3.6 INSTRUMENT CONTROL VIA RS 232C INTERFACE AND EXTERNAL COMPUTER

Any computer with RS 232 C interface can be used to control UVIKON 860. The instrument uses ASCII (American Standard Code for Information Interchange).

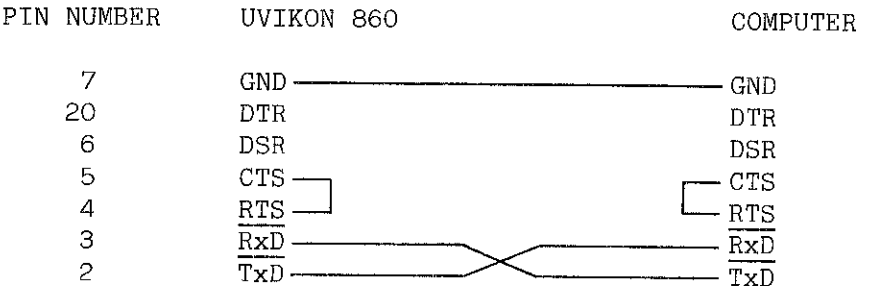
3.6.1 CONNECTION OF A COMPUTER TO UVIKON 860

The following interface wiring will work with computers such as: IBM PC / XT / AT, KONTRON ERGO PC, COMPAQ, and most other computers (for pin assignment see chapter 1, INSTALLATION)

This layout allows a hardware handshake



If this layout does not work with your computer, it is best to use the interface without any handshake lines.

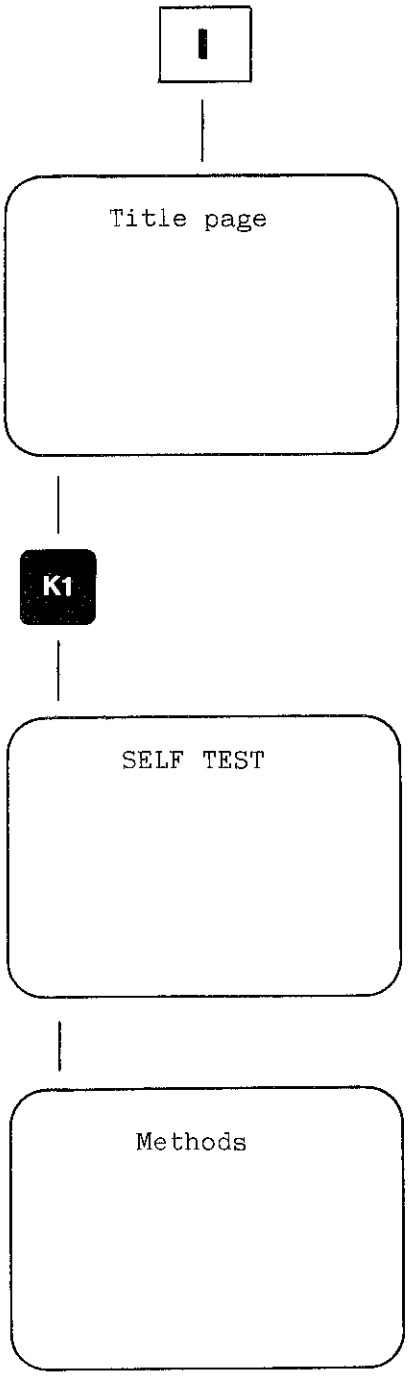


It is, however, still possible to use the UVIKON 860 in the (software)-handshake mode (see 3.6.2 USER DATA ENTRY) if you make use of the "ACK"- and "ENQ" - signs which are transmitted and received by UVIKON 860 (see 3.6.6 software handshake codes and 3.6.7 examples).

3.6.1 CONNECTION OF A COMPUTER TO UVIKON 860 (cont.)

The following steps have to be taken before external instrument control can start.

Connect RS 232C cable



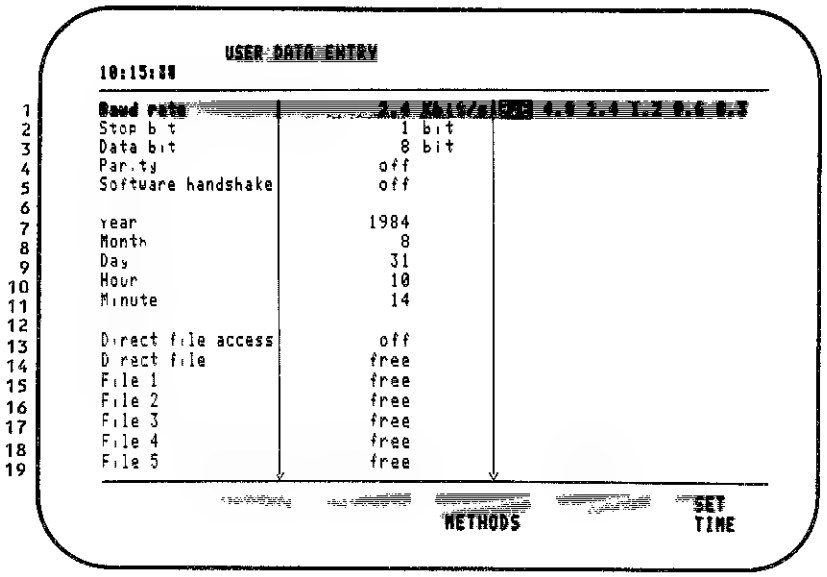
- Switch on Computer and UVIKON 860

- START SELF TEST

- Data can now be entered via serial interface

3.6.2 USER DATA ENTRY

USER DATA ENTRY is mainly used to set up the serial interface of the instrument to match the requirements of your computer.
Further it is used to set the instrument's clock which gives the time for the printout onto the P800 Printer/Plotter.
File protection and direct file access are also defined on this page.



Starts the instruments clock with new data

Sets up METHODS page

Line 1-5: Define the data format to match your computer. See the instruction manual of the computer. If the software handshake is "on" the instrument transmits "ACK" or "ENQ" and receives "ACK" see the ESC-Command concept on 3.6.3, 3.6.6 and examples on 3.6.7. Baud rates higher than 2400 should only be used with software handshake.

Line 6: Space

Line 7-11: Enter your local time and date. The instrument's clock has a four year cycle. The clock starts when SET TIME is pressed.

3.6.2 USER DATA ENTRY (cont.)

Line 12: Space

Line 13: If direct file access is "ON" the "DIR"-file will be loaded automatically after switching on of the instrument and completed self test..

Line 14-23: You can protect your file against being mistakingly deleted.

3.6.3 THE ESC-COMMAND CONCEPT

The RS 232 C interface uses the half duplex mode which means that the interface cannot transmit data to the computer at the same time as it receives data from the computer (and vice versa).

The UVIKON 860 accepts commands in ASCII-code. Each command starts with "ESC" / (escape) and is completed with "CR" (carriage return).

Example: ESC 1/2/800 CR
A new "ESC-"command is only accepted after a "CR".
Every "ESC"-command can be derived from the display on the screen.

Example: You want to make a scan via the serial interface.
The scan range is 400-800 nm

- Start from METHODS page

ESC 1/1 CR
└── Scan

Instrument sets up PARAMETER page for λ-scan

- Scale X min

ESC 2/1/400CR
└── Value for first parameter
└── First parameter:
└── Line 2
defines cursor location

- Scale X max

ESC 2/2/800 CR
└── Value for second parameter
└── Second parameter:
└── Line 2
defines cursor location

With help of the screen or the descriptions in chapter 3 you can now write your own ESC-commands. Format and combination errors have the same effect as when working via the keybaord.
In software handshake mode correct entries are confirmed by the instrument with an "ACK" (acknowledge)-sign. In case of errors, the instrument transmits an "ENQ" (enquiry)-sign and the error is displayed in the message section of the instrument screen. When reading data from the instrument, UVIKON 860 will transmit the first data pair e.g. 400.0 / 1.004 CR and then wait for an "ACK" from the computer to continue transmission. "ACK" and "ENQ"- signs are disabled if the software handshake is set "off" on USER DATA ENTRY. See also: Interface error messages in 3.6.8 and examples in 3.6.7.
It is advisable to check every command separately especially when you write your first program for UVIKON 860.

3.6.4 LIST OF ESC-COMMANDS

Most ESC-commands can be derived from the screen. The following list shows you the commands which are used to control the instrument.

UVISOFT keys

K1	ESC a CR
K2	ESC b CR
K3	ESC c CR
K4	ESC d CR
K5	ESC e CR
K6	ESC f CR

FUNCTION KEYS

reset	ESC g CR	
auto zero	ESC h CR	
hard copy	ESC i CR	
clear	ESC q CR	
λ	ESC o CR	ESC 1/1/ XXX.X CR

3.6.4 LIST OF ESC-COMMANDS (cont.)

Method select commands on METHODS page

The number of usable Methods depends on your installed Software Version.
The ESC-Commands used to access the different methods are related to the position of each method on the METHODS page.
The first method's access code (LAMBDA SCAN) is ESC 1/1 CR. The code for the next method (LAMBDA FIX) is ESC 2/1 CR. The codes are formed in ascending order ending with ESC 11/1 CR for CURVE ADDITION in Software pack 3 and ESC 7/1 CR for PEAK DETECTION in Software pack 1 and 2.

DATA TRANSFER COMMANDS

Read current monochromator wavelength and currently measured absorbance and temperature value.	ESC x CR	
Output data format: 600.0nm 0.052699abs 26.3 C CR		
Transmit Abs values of stored curve.	ESC c CR	(WRITE TO EXTERNAL)
Read Abs values from external computer	ESC b CR	(READ FROM EXTERNAL)

For data format see chapter 3.6.5

These commands can only be used on the CURVE MEMORY page. Only Abs values of the stored curves can be transferred.

Special commands

Unlock keyboard	ESC y CR	(preset)
Lock keyboard	ESC z CR	

3.6.5 CURVE DATA TRANSFER TO AND FROM AN EXTERNAL COMPUTER

All measurement methods produce an output to the serial Interface if the parameter "Data to RS 232C" is set "on". The measurement methods with table display (LAMBDA FIX, LAMBDA PROGRAM, KINETICS and ABS/CONCENTRATION) produce the same output via the serial interface as to the screen and printer/plotter.

The measurement methods LAMBDA SCAN and TIME DRIVE produce the following output format:

LAMBDA SCAN

```
START CR
LAMBDA SCAN CR
ENERGY = NORMAL CR
DELTA = 0.1000 CR
540.000 / -0.004672 CR
540.100 / 0.000093 CR
          .
          .
          .
          .
END CR
```

"Mode" is always Abs even if %T is selected.

TIME DRIVE

```
START CR
TIME DRIVE AT 540.0 CR
ENERGY = NORMAL CR
DELTA = 0.0010 CR
0000.000 / 1.131530 CR
0000.001 / 1.132684 CR
          .
          .
          .
          .
END CR
```

"Mode" is always Abs even if %T is selected.

3.6.5 CURVE DATA TRANSFER TO AND FROM AN EXTERNAL COMPUTER (cont.)

The calculation method DERIVATIVE OVERLAY allows curve data output of the cursor-selected derivative order. Transmission is started with the UVISOFT key "WRITE TO EXTERNAL" (ESC c CR).

DERIVATIVE OVERLAY

Example:

```
START CR
LAMBDA SCAN CR
ENERGY = NORMAL CR
DELTA = 0.1000 CR
MODE = ABS CR
DERIVATIVE 1 CR
540.000 / - 0.016428 CR
540.100 / 0.173524 CR
      .
      .
END CR
```

The selected Mode is valid. Derivatives of TIME DRIVE Curves can also be transferred.

CURVE MEMORY

The CURVE MEMORY page can be used to transfer curve data to and from an external computer. Use the UVISOFT key "WRITE TO EXTERNAL" (ESC c CR) to write cursor selected curve data to the computer.

Example:

Data format TIME DRIVE

```
START CR
TIME DRIVE AT 540.0 CR
ENERGY = NORMAL CR
DELTA = 0.0010 CR
0000.000 / 1.131530 CR
0000.001 / 1.132684 CR
      .
      .
END CR
```

Data format LAMBDA SCAN

```
START CR
LAMBDA SCAN CR
ENERGY = NORMAL CR
DELTA = 0.1000 CR
540.000 / -0.004672 CR
540.100 / 0.000093 CR
      .
      .
END CR
```

The Mode is always Abs even if the curve was measured in %T.

The UVISOFT key "READ FROM EXTERNAL" (ESC b CR) is used to input curve data from an external computer into the curve memory of UVIKON 860. The curve must have the data format listed above or transfer will be rejected (see chapter 3.6.8 INTERFACE ERROR MESSAGES).
The message READ FROM EXTERNAL appears in the message section of the screen during transfer.
The new curve will be written into the first line of the curve memory page after the transfer has been completed.

3.6.6 SOFTWARE HANDSHAKE CODES

From UVIKON 860 to Computer

ASCII	HEX	DEC	
ACK	06	6	The last ESC-command or data string from the computer was correct. The next command or string can be entred.
ENQ	05	5	The last ESC-command from the computer produced an instrument or an interface error.
Character String: "START"; "END"			Start and End of data transmission. (Also transmitted in HW-Handshake mode)

From Computer to UVIKON 860

ACK	06	6	Confirms reception of last data pair and asks for next data pair.

For your notes:

3.6.7 EXAMPLES

Example 1: ESC-Transmission

```
10 REM eSC-codes transmission 8413 ff
20 MAXFILES=2
30 OPEN "com:6n71nn" FOR OUTPUT AS #1
40 OPEN "com:6n71nn" FOR INPUT AS #2
50 ESC$=CHR$(27):CR$=CHR$(13)
60 ENQ$=CHR$(5):ACK$=CHR$(6)
70 CLS
80 PRINT "    ** ESC-CODES TRANSMISSION **"
90 PRINT:PRINT "You can enter any ESC-codes sequence."
100 PRINT 'When finished press "CHR$(34)CHR$(129)CHR$(34)
110 REM Collects ESC-codes
120 N=1
130 PRINT
140 LINE INPUT "   Code ? ";CO$(N)
150 IF CO$(N)="" THEN 190
160 N=N+1
170 GOTO 140
180 REM Transmits ESC-codes
190 N=N-1
200 FOR A=1 TO N
210 PRINT#1,ESC$;CO$(A);CR$;
220 A$=CO$(A):GOSUB 1000:REM SW-nands.
230 NEXT A
240 GOTO 120
```

```
1000 REM SW-nandshake routine 8413 ff
1010 C=0:GOTO 1030
1020 PRINT#1,ESC$;A$;CR$;
1030 HS$=INPUT$(1,#2)
1040 IF HS$=ENQ$ THEN 1050 ELSE 1100
1050 C=C+1
1070 IF C>4 THEN 1080 ELSE 1020
1080 PRINT "Transmission error at code "A$:BEEP
1090 END
1100 RETURN
```

3.6.7 EXAMPLES

Example 1: ESC-Transmission (cont.)

The programs are written in BASIC. They can be rewritten for most BASIC-Computers.

ESC-Codes transmission with RS 232C Interface. Written in Microsoft BASIC on a NEC PC 8201 A.

This short program can be used to enter any ESC-codes sequence. It is useful to check your ESC-codes before you use them in your own program.

Line 30 + 40	open the serial interface (RS 232C) for data transmission to and from UVIKON 860.
Line 50 + 60	define the characters used for software handshake and data transmission.
Line 140	collects any ESC-code. Example: 2/1/1.5
Line 150	checks for last entry
Line 160	counts the number of codes
Line 210	transmits one ESC-code
Line 220	calls software handshake routine
	The software handshake routine has to be linked with this program.

Software handshake routine

This routine can be used if you want to work without hardware lines as described in chapter 3.6.1.
The program transmits one command up to 5 times if a transmission error occurs.

Line 1010	Sets the counter 0 and calls line 1030 for input of handshake-string
Line 1020	Transmits ESC-code again if an ENQ-sign was transmitted by UVIKON 860
Line 1030	Input of handshake-string
Line 1040	Handshake string check
Line 1070	Transmission is repeated if C < 4
Line 1080 + 1090	Stops the program if the transmission error still occurs.

3.6.7 EXAMPLES

Example 2: Reads curve data from memory

```
10 '                    Reads curve data from curve memory
20 '                    IBM PC DOS 2.0
30 '                    last update 23.8.84 Frederic Furrer
40 '                    TEGIMENTA AG
50 '
60 '
70 CLS:PRINT:PRINT "      HW- or SW-handshake (SW=1/HW=2) ";
80 INPUT D
90 PRINT:LINE INPUT "      Enter line number on CURVE MEMORY page ";L$
100 PRINT:LINE INPUT "      Enter curve name ";N$
110 PRINT:INPUT "     Use drive a,b,c or d for curve data ";D$
120 N$=D$+":"+N$
130 ON D GOTO 140,150
140 OPEN "COM1:2400,N,8,1,RS,CS,DS,CD" AS #1:GOTO 400
150 OPEN "COM1:2400,N,8,1,CS15000,DS0" AS #1
200 '
210 '****************** Reads with HW-handshake ***********************************
220 '
230 '
240 OPEN N$ FOR OUTPUT AS #2
250 PRINT #1,CHR$(27);"g"
260 PRINT #1,CHR$(27);"e"
270 PRINT #1,CHR$(27);L$
280 PRINT #1,CHR$(27);"c"
290 INPUT #1,C$
300   PRINT #2,C$
310   IF C$="END" THEN PRINT :PRINT C$:END
320   PRINT C$"    ";
330   IF C$="START" THEN PRINT
340 GOTO 290
400 '
410 '****************** Reads with SW-handshake ***********************************
420 '
430 '
440 OPEN N$ FOR OUTPUT AS #2
450 PRINT #1,CHR$(27);"g":GOSUB 600
460 PRINT #1,CHR$(27);"e":GOSUB 600
470 PRINT #1,CHR$(27);L$:GOSUB 600
480 PRINT #1,CHR$(27);"c":GOSUB 600
490 PRINT #1,CHR$(6)
500   INPUT #1,C$
510   PRINT #2,C$
520   IF C$="END" THEN PRINT :PRINT C$:END
530   PRINT C$"    ";
540   IF RIGHT$(C$,5)="START" THEN PRINT
550 GOTO 490
600 '
610 '****************** SW-handshake ***********************************************
620 '
630 '
640 HS$=INPUT$(1,#1)
660 IF HS$=CHR$(5) THEN PRINT "Transmission error":BEEP
670 RETURN
```

3.6.7 EXAMPLES

Example 2: Reads curve data from memory (cont.)

Program reads curve data from CURVE MEMORY

written in IBM BASIC 2.0 on a IBM PC DOS 2.0

This program reads curve data from CURVE MEMORY and stores data onto disk of the computer. Either handshake mode can be used.

Line 70	Defines if HW- or SW-handshake is used. Enter "1" for SW-handshake Enter "2" for HW-handshake
Line 90	Defines the line number on the CURVE MEMORY page.
Line 100	Defines the curve name. This name will appear in the disk directory.
Line 110	4 different drives can be used with the IBM PC. A Single drive computer uses only drive a. Curve data will be stored on the selected drive.
Line 130	Decides how the interface has to be set up (according to line 70).
Line 140	This command opens the serial interface for SW-handshake with a baudrate of 2400 bauds, no parity bit check, 8 data bits, 1 stop bit and no check of handshake lines. UVIKON 860 has to be set up accordingly on the USER DATA ENTRY page.
Line 150	This command opens the serial interface for HW-handshake with a baudrate of 2400 bauds, no parity bit check, 8 data bits, 1 stop bit, and a relatively long waiting time for the CTS "Clear to send" signal from UVIKON 860 to allow for page build up or moving the cursor from top to bottom line.
Line 240	Opens a file with the specified name from line 100.
Lines 250-280	This code sequence has the following functions. "g" = reset; "e" = FILE MEMORY; L$ = cursor moves to specified line; "c" = DATA TO EXTERNAL.
Lines 300-340	Print data onto screen and into specified file.
Lines 400-550	Same function as line 200-340 but with SW-handshake
Line 490	Note: An ACK-sign (CHR$(6)) has to be sent from the computer before a data string is transferred by UVIKON 860 (applies only for SW-handshake mode).
Line 600-690	SW-handshake routine

3.6.7 EXAMPLES

Example 3: Lambda ratio

```
10 '                              LAMBDA RATIO UVIKON 860
20 '                              VERSION 1.1 IBM PC DOS 2.0
30 '                              Last update 29.8.84 Frederic Furrer
40 '                              TEGIMENTA AG
50 '
60  '
70 CLS
80 PRINT "              Connect computer to UVIKON 860 and switch instrument on
90 OPEN "com1:2400,n,8,1,cs15000,ds0" AS #1
100 KEY OFF
110 KEY 1,"" : KEY 2,"" : KEY 3,"" : KEY 4,""
120 LOCATE 3,19:PRINT "**  L A M B D A   R A T I O   UVIKON 860  **
130 LOCATE 4,19:PRINT "=========================================
140 LOCATE 7,20:PRINT "(F1)=Use LAMBDA FIX standard parameters
150 LOCATE 8,20:PRINT "(F2)=Parameter file alredy existing
160 LOCATE 9,20:PRINT "(F3)=Create parameter file
170 LOCATE 10,20:PRINT "(F4)=Parameter entry via UVIKON 860 keyboard using LAMBD
A FIX
180 ON KEY(1) GOSUB 1000
190 ON KEY(2) GOSUB 2000
200 ON KEY(3) GOSUB 3000
210 ON KEY(4) GOSUB 6000
220 KEY(1) ON : KEY(2) ON : KEY(3) ON : KEY(4) ON
230 A$=INKEY$ : IF A$="" THEN 230
240 '
250 '******************* Collects the two ratio wavelengths ********************
260 '
270 '
280 CLS
290 CLOSE #2
300 PRINT : PRINT TAB(10); : LINE INPUT "Enter first wavelength ",WAVE1$
310 PRINT TAB(10); : LINE INPUT "Enter second wavelength ";WAVE2$
320 '
330 '******************* Prepares interface, display and printer ***************
340 '
350 '
360 INPUT "          Print results (y/n) ";PRINTER$
370 PRINT "          Press any key when ready for measurement
380 A$=INKEY$ : IF A$="" THEN 380
390 PRINT : PRINT TAB(20) "**  L A M B D A   R A T I O   RESULTS  **" : PRINT
400 IF PRINTER$="y" THEN 410 ELSE 420
410 LPRINT TAB(19)"**  L A M B D A   R A T I O   RESULTS  **" : LPRINT
420 PRINT #1,CHR$(27);"s" : GOSUB 4000
430 PRINT #1,CHR$(27);"3/1" : GOSUB 4000
440 '
450 '******************* Reads current wavelength ******************************
460 '
470 '
480 PRINT #1,CHR$(27);"b" : GOSUB 4000
490 PRINT #1,CHR$(27);"x" : GOSUB 4000
500 INPUT #1,WAVE0$ : GOSUB 4000
```

3.6.7 EXAMPLES

Example 3: Lambda ratio (cont.)

LAMBDA RATIO Version 1.1

Written in IBM BASIC on a IBM PC

This program produces the following output:

```
**  L A M B D A  R A T I O  RESULTS  **

 Lambda 1 :  400.0 nm   0.140 abs

 Lambda 2 :  510.0 nm   1.610 abs

 Difference                  :   1.470 abs
 Ratio Lambda 1 / Lambda 2 :   0.087
 Ratio Lambda 2 / Lambda 1 :  11.500
```

Lines 10-230 — Define title page, open the serial interface and select the parameter-entry mode by using the function keys F1-F4.

Lines 240-310 — Input of ratio wavelengths.
Both wavelengths have to be entred for every measurement.

Lines 320-410 — Prepare printer and display and waits until the sample is inserted and ready for measurement.

Lines 420-430 — This code sequence has the following functions:
"g" = reset; "3/1" = LAMBDA FIX.

Lines 440-500 — Read current wavelength.
The current wavelength is used to define the Lambda drive positioning time in routine 5000.
The functions are:
"b" = PARAMETER; "x" = Read current monochromator position and measured %T- or abs-value.

3.6.7 EXAMPLES

Example 3: Lambda ratio (cont.)

```
510 '
520 '******************** Measures at first wavelength ***************************
530 '
540 '
550 PRINT #1,CHR$(27);"o" : GOSUB 4000
560 PRINT #1,CHR$(27);"1/1/";WAVE1$ : GOSUB 5000
570 PRINT #1,CHR$(27);"x" : GOSUB 4000
580 INPUT #1,RESULT1$ : GOSUB 4000
590 VALUE1$=MID$(RESULT1$,9,6)
600 UNIT$=MID$(RESULT1$,15,3)
610 PRINT : PRINT TAB(20) "Lambda 1 :  "WAVE1$" nm   "VALUE1$" "UNIT$
620 IF PRINTER$="y" THEN 630 ELSE 640
630 LPRINT : LPRINT TAB(20) "Lambda 1 :  "WAVE1$" nm   "VALUE1$" "UNIT$
640 '
650 '******************** Measures at second wavelength **************************
660 '
670 '
680 PRINT #1,CHR$(27);"o" : GOSUB 4000
690 PRINT #1,CHR$(27);"1/1/";WAVE2$
700 WAVE0$=WAVE1$ : WAVE1$=WAVE2$ : GOSUB 5000
710 PRINT #1,CHR$(27);"x" : GOSUB 4000
720 INPUT #1,RESULT2$ : GOSUB 4000
730 VALUE2$=MID$(RESULT2$,9,6)
740 PRINT : PRINT TAB(20) "Lambda 2 :  "WAVE2$" nm   "VALUE2$" "UNIT$
750 IF PRINTER$="y" THEN 760 ELSE 810
760 LPRINT : LPRINT TAB(20) "Lambda 2 :  "WAVE2$" nm   "VALUE2$" "UNIT$
770 '
780 '******************** CALCULATION, DISPLAY AND PRINTOUT **********************
790 '
800 '
810 DIFFERENCE=ABS(VAL(VALUE1$)-VAL(VALUE2$))
820 RATIO1=VAL(VALUE1$)/VAL(VALUE2$)
830 RATIO2=VAL(VALUE2$)/VAL(VALUE1$)
840 PRINT:PRINT TAB(20) USING "Difference                    :  ##.###";DIFFERENCE;
850 PRINT " "UNIT$
860 PRINT TAB(20) USING "Ratio Lambda 1 / Lambda 2 :  ##.###";RATIO1
870 PRINT TAB(20) USING "Ratio Lambda 2 / Lambda 1 :  ##.###";RATIO2
880 IF PRINTER$="y" THEN 890 ELSE 940
890 LPRINT:LPRINT TAB(20)USING"Difference                    :  ##.###";DIFFERENCE;
900 LPRINT " "UNIT$
910 LPRINT TAB(20) USING"Ratio Lambda 1 / Lambda 2 :  ##.###";RATIO1
920 LPRINT TAB(20) USING"Ratio Lambda 2 / Lambda 1 :  ##.###";RATIO2
930 FOR LINEFEED = 1 TO 16 : LPRINT : NEXT LINEFEED
940 PRINT : PRINT TAB(10); : INPUT "Another measurement (y/n) ";MEASURE$
950 IF MEASURE$ = "y" THEN 290 ELSE 960
960 END
```

3.6.7 EXAMPLES

Example 3: Lambda ratio (cont.)

Lines 550-560	The functions are: "o" = set Lambda; "1/1/" WAVE1$ = enter Lambda 1 Routine 5000 calculates and waits for Lambda drive positioning.
Line 580	Reads current wavelength and value.
Line 600	Reads unit
Lines 610-630	Output for screen and printer.
Lines 640-760	Same function as line 510-630, but for second wavelength.
Lines 770-960	Calculates difference and ratios of the two measured values. Results are displayed and printed.

3.6.7 EXAMPLES

Example 3: Lambda ratio (cont.)

```
1000 '
1010 '*************** Loads standard parameters into UVIKON 860 **************
1020 '
1030 '
1040 DATA s,3/1,15/1,13/2,11/1,10/1,9/1,8/1/340
1050 DATA 7/2,5/1/.1,4/1/1,3/1/1,2/1/300,1/1
1060 FOR I=1 TO 14
1070   READ CO$
1080   PRINT #1,CHR$(27);CO$:GOSUB 4000
1090 NEXT I
1100 PRINT
1110 RETURN 240
2000 '
2010 '*************** Loads parameters of existing file into UVIKON 860 ******
2020 '
2030 '
2040 PRINT:LINE INPUT "          Enter name of existing file  ";N$
2050 OPEN N$ FOR INPUT AS #2
2060 IF EOF (2) THEN RETURN 240
2070   INPUT #2, CO$
2080   PRINT #1,CHR$(27);CO$ : GOSUB 4000
2090 GOTO 2060
3000 '
3010 '************* Creates parameter file and loads parameters into UVIKON 860
3020 '
3030 '
3040 PRINT:LINE INPUT "          Enter name of new parameter file  ";N$
3050 OPEN N$ FOR OUTPUT AS #2
3060 PRINT
3070 PRINT "          Enter parameter codes. Press "CHR$(34)"enter"CHR$(34)" twic
e after last code"
3080 PRINT
3090 LINE INPUT "          Code ? ";CO$
3100   IF CO$="" THEN CLS ELSE 3120
3110   RETURN 240
3120   PRINT #1,CHR$(27);CO$
3130   PRINT #2,CO$
3140 GOTO 3090
4000 '
4010 '*************** Waits for parameter entry into UVIKON 860 **************
4020 '
4030 '
4040 FOR Z=1 TO 500:NEXT Z:RETURN
5000 '
5010 '*************** Lambda drive positioning time ****************************
5020 '
5030 '
5040 W0$=LEFT$(WAVE0$,5)
5050 W1$=LEFT$(WAVE1$,5)
5060 FACTOR=ABS(VAL(W0$)-VAL(W1$))
5070 POSITION = FACTOR/15+4
5080 TIME$="0"
5090 WHILE TIMER < POSITION : WEND
5100 RETURN
6000 RETURN 240
```

3.6.7 EXAMPLES

Example 3: Lambda ratio (cont.)

Lines 1000-1110 This routine loads the preset parameters of LAMBDA FIX into UVIKON 860.

Lines 2000-2090 This routine reads previously stored parameter codes using routine 3000 and loads parameters into UVIKON 860.

Lines 3000-3140 This routine creates a parameter file with a specified name. The file is stored on the PC's disk for later use.

Lines 4000-4040 Delay time for page build up or moving the cursor.

Lines 5000-5100 This routine calculates the time for lambda positioning and waits, after the PC's timer is set to zero, until position is reached.

Line 6000 Starts the program on line 240, when all parameters are entred via the UVIKON 860 keyboard.

3.6.7 EXAMPLES

Example 4: Lambda program

```
10 '                LAMBDA PROGRAM UVIKON 860 for up to 8 wavelengths
20 '                VERSION 1.1 IBM PC DOS 2.0
30 '                last update 29.8.84 Frederic Furrer
40 '                TEGIMENTA AG
50 '
60 '
70 CLS
80 PRINT "            Connect computer to UVIKON 860 and switch instrument on
90 OPEN "com1:2400,n,8,1,cs15000,ds0" AS #1
100 KEY OFF
110 KEY 1,"":KEY 2,"":KEY 3,""
120 LOCATE 3,16:PRINT "**  L A M B D A  P R O G R A M  UVIKON 860  **
130 LOCATE 4,16:PRINT "=========================================
140 LOCATE 7,20:PRINT "(F1)=Use LAMBDA FIX standard parameters
150 LOCATE 8,20:PRINT "(F2)=Parameter file already existing
160 LOCATE 9,20:PRINT "(F3)=Create parameter file
170 ON KEY(1) GOSUB 1000
180 ON KEY(2) GOSUB 2000
190 ON KEY(3) GOSUB 3000
200 KEY(1) ON:KEY(2) ON:KEY(3) ON
210 A$=INKEY$:IF A$="" THEN 210
220 '
230 '********** collects wavelengths and creates "wave-file" for later use ***
230 '
240 '
250 CLOSE #2
260 INPUT "          Use filed wavelengths (y/n) ";D$
270 IF D$="y" THEN 390
280 PRINT
290 INPUT "          How many wavelengths (maximum 8) ";WVN%
300 IF WVN%)8 THEN 290
310 PRINT:PRINT "      All wavelengths are filed for later use"
320 OPEN "wave" FOR OUTPUT AS #2
330 FOR N=1 TO WVN%
340   PRINT "          Enter wavelength "N;
350   LINE INPUT;WV$(N)
360   PRINT #2,WV$(N):PRINT
370 NEXT N
380 CLS
```

3.6.7 EXAMPLES

Example 4: Lambda program (cont.)

LAMBDA PROGRAM Version 1.1

Written in IBM BASIC on a IBM PC.

This program produces the following output:

```
**  L A M B D A   P R O G R A M  RESULTS  **

  NR   WAVELENGTH   VALUE   MODE

   1       400.0     0.140   abs
   2       425.0     0.291   abs
   3       450.0     0.755   abs
   4       475.0     1.203   abs
   5       500.0     1.528   abs
   6       525.0     1.451   abs
   7       550.0     0.723   abs
   8       575.0     0.259   abs
```

Lines 10-210 Defines title page, opens the serial interface and selects the parameter entry mode by using the function keys F1-F3.

Lines 220-380 Reads up to 8 wavelengths from the PC's keyboard and creates the "wave" -file onto the PC's disk for later use.

3.6.7 EXAMPLES

Example 4: Lambda program (cont.)

```
390 '
400 '*************** MEASUREMENT, DISPLAY AND PRINTOUT **********************
410 '
420 '
430 CLOSE #2
440 INPUT "          Print results (y/n) ";P$
450 PRINT "          Press any key when ready for measurement
460 A$=INKEY$:IF A$="" THEN 460
470 LOCATE 17,18:PRINT"**  L A M B D A  P R O G R A M  RESULTS  **
480 IF P$="y" THEN 490 ELSE 510
490 LPRINT TAB(16)"**  L A M B D A  P R O G R A M  RESULTS  **"
500 LPRINT:LPRINT:LPRINT TAB(24)"NR  WAVELENGTH  VALUE  MODE":LPRINT
510 LOCATE 19,10
520 PRINT "NR  WAVELENGTH  VALUE  MODE     NR  WAVELENGTH  VALUE  MODE"
530 OPEN "wave" FOR INPUT AS #2
540 I=0
550 IF EOF (2) THEN 700
560   INPUT #2,WV$
570   PRINT #1,CHR$(27);"2/1/";WV$:FOR Z=1 TO 5000:NEXT Z
580   PRINT #1,CHR$(27);"a":GOSUB 4000
590   I=I+1
600   INPUT #1,RES$ : GOSUB 4000
610   RES$=RIGHT$(RES$,21)
620   IF I>4 THEN X=42 ELSE X=10
630   IF I>4 THEN U=I-5 ELSE U=I
640   Y=U+20
650   LOCATE Y,X
660   PRINT I"   "RES$
670   IF P$="y" THEN LPRINT TAB(24) I"   "RES$
680   PRINT #1,CHR$(27);"b"
690 GOTO 550
700 IF P$="y" THEN 710 ELSE 730
710 V=I+14
720 FOR P=1 TO V:LPRINT:NEXT P
730 PRINT:INPUT "          Another run (y/n) ";R$
740 IF R$="y" THEN CLS ELSE 760
750 GOTO 390
760 END
```

3.6.7 EXAMPLES

Example 4: Lambda program (cont.)

Lines 430-520	Prepares printer and display and waits until the sample is inserted and ready for measurement.
Line 530	Opens "wave" file on the PC's disk.
Line 540	Sets the wavelength counter to zero.
Line 550	If all wavelengths are read the computer will stop measurement.
Line 560	Reads wavelength from "wave" file.
Lines 570-580	The functions are: "2/1" WV$ = enters wavelength on parameter page; "a" = RUN SAMPLE. The delay time on line 570 is used for positioning.
Line 590	Increments the wavelength counter by 1.
Line 600	Reads result.
Line 610	Defines result format.
Lines 620-660	Defines display format of result.
Line 670	Printer result.
Line 680	Function: "b" = PARAMETER
Line 690	Starts measurement with next wavelength.
Lines 700-720	Linefeed for printer.
Lines 730-750	Another run with the same wavelengths can be started.

3.6.7 EXAMPLES

Example 4: Lambda program (cont.)

```
1000 '
1010 '*************** Loads standard parameters into UVIKON 860 *************
1020 '
1030 '
1040 DATA 9,3/1,15/1,13/2,11/1,10/1,9/1,8/1/340
1050 DATA 7/2,5/1/.1,4/1/1,3/1/1,2/1/300,1/1
1060 FOR I=1 TO 14
1070   READ CO$
1080   PRINT #1,CHR$(27);CO$:GOSUB 4000
1090 NEXT I
1100 PRINT
1110 RETURN 220
2000 '
2010 '*************** Loads parameters of existing file into UVIKON 860 ******
2020 '
2030 '
2040 PRINT:LINE INPUT "          Enter name of existing file  ";N$
2050 OPEN N$ FOR INPUT AS #2
2060 IF EOF (2) THEN RETURN 220
2070   INPUT #2, CO$
2080   PRINT #1,CHR$(27);CO$ : GOSUB 4000
2090 GOTO 2060
3000 '
3010 '************* Creates parameter file and loads parameters into UVIKON 860
3020 '
3030 '
3040 PRINT:LINE INPUT "          Enter name of new parameter file  ";N$
3050 OPEN N$ FOR OUTPUT AS #2
3060 PRINT
3070 PRINT "          Enter parameter codes. Press "CHR$(34)"enter"CHR$(34)" twic
e after last code"
3080 PRINT
3090 LINE INPUT "          Code ? ";CO$
3100   IF CO$="" THEN CLS ELSE 3120
3110   RETURN 220
3120   PRINT #1,CHR$(27);CO$
3130   PRINT #2,CO$
3140 GOTO 3090
4000 FOR Z=1 TO 500:NEXT Z:RETURN
```

Lines 1000-4000 See LAMBDA RATIO program.

3.6.8 INTERFACE ERROR MESSAGES

The instrument stops action (and transmits an "ENQ" enquiry-sign when software handshake is used) if an error is detected. The related error message is displayed in the message section of the screen.
Some instrument errors as described in chapter 4, have to be cleared by sending ESC q CR (clear) before any other command is entered.
When software handshake is used the instrument will transmit "ACK", and you can continue your work via the serial interface.

The following errors are detected by the interface and need not to be cleared.

ERROR MESSAGE	REASON	ELIMINATION
PARITY ERROR	Parity bit check failed. Interference on data line	Remove possible source of interference (e.g. magnetic and electromagnetic fields, bad earth). Keep data line short.
DATA TRANSFER ERROR	Stop bit not received	Check data format and baud rate Check interference on data line
	Buffer overflow	Do not send new commands before the previous command is processed
	Illegal command sent by the computer	Check data format Check command
RS TIME OUT	Computer is not ready to receive data	Check computer and handshake lines
DATA READ ERROR	Data format or transmission incorrect when writing curve data to curve memory	Check data format
MEMORY OVERFLOW	Curve memory is full	Delete obsolete curves from curve memory and try again

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4. TROUBLE SHOOTING

4.1 ERROR MESSAGES

Operation errors, malfunctions or system errors are automatically detected and displayed during operation.

ERROR MESSAGE	REASON	ELIMINATION
FORMAT ERROR	Invalid data format entered	Press "clear" and enter correct data format
OUT OF LIMIT	Invalid value entered	Press "clear" and enter new value within limits
COMBINATION ERROR	Entered parameter produces incorrect combination with other parameters	Establish correct parameter combination by changing values of one or more of the inverse displayed parameter
MEMORY OVERFLOW	The amount of data used for the measurement is too large	Change parameter or delete unwanted curves from CURVE MEMORY
LAMP NOT READY	Lamp has failed	Replace lamp
	D2 lamp has not yet ignited	Wait for D2-Lamp ignition
ERROR λ DRIVE	Position of wavelength can not be found	Switch instrument off and on again to start self test. If error does not clear call Service Engineer
COVER OPEN	Sample compartment is not completely closed	Close sample compartment cover
	Cover has been opened during Baseline run	Redo Baseline
	Switch is faulty	Call Service Engineer

4.1 ERROR MESSAGES (cont.)

ERROR MESSAGE	REASON	ELIMINATION
LOW ENERGY	Lamp has failed	Replace lamp
	Double beam: Too little light in the reference channel	Check samples and λ
	Single beam: Too little light for balance	Check samples and λ
	Double beam baseline run: Too little light in reference channel	Check blanks and λ Redo baseline
	Single beam baseline run: Too little light for balance	Check blank and λ Perform Autozero at max transmission Redo baseline
	High voltage control out of order	Call Service Engineer
HIGH ENERGY	Double beam baseline run: Too little light in sample channel	Check blanks and λ Redo baseline
	Single beam baseline run: Too much light for balance	Check blank and λ Perform autozero at max. transmission Redo baseline
NET FREQUENCY OUT OF RANGE	The mains net frequency is out of limit (50 or 60 Hz $\pm$ 5%)	Connect instrument to other mains net. If not possible, keep in mind that the instrument will not perform within the published specifications

4.1 ERROR MESSAGES (cont.)

ERROR MESSAGE	REASON	ELIMINATION
OVERFLOW	Measured value exeeds upper limit of measure-ment range	Check samples Check auto zero value
UNDERFLOW	Measured value exeeds lower limit of measure-ment range	Check samples Check auto zero value
PROGRAM ERROR	Fault in the program memory	Call Service Engineer
DISCONNECT ACCESSORY	Too many Accessories connected.	Disconnect one Accessory
	Fault in Accessory	Call Service Engineer
UPPER MEMORY LIMIT XXXXX	Battery buffer switch on CPU 88 not closed	Close switch on battery buffer (see 1.7)
	Battery empty	Call Service Engineer for replacement
ERROR DATA MEMORY	Instrument is short of RAM memory	Expand RAM memory
	Error in data memory	Call Service Engineer
CALIB VALUE MISSING	More calibration data is needed for the selected function. ABS / CONCENTRATION only	Set up calibration page and measure the missing standards

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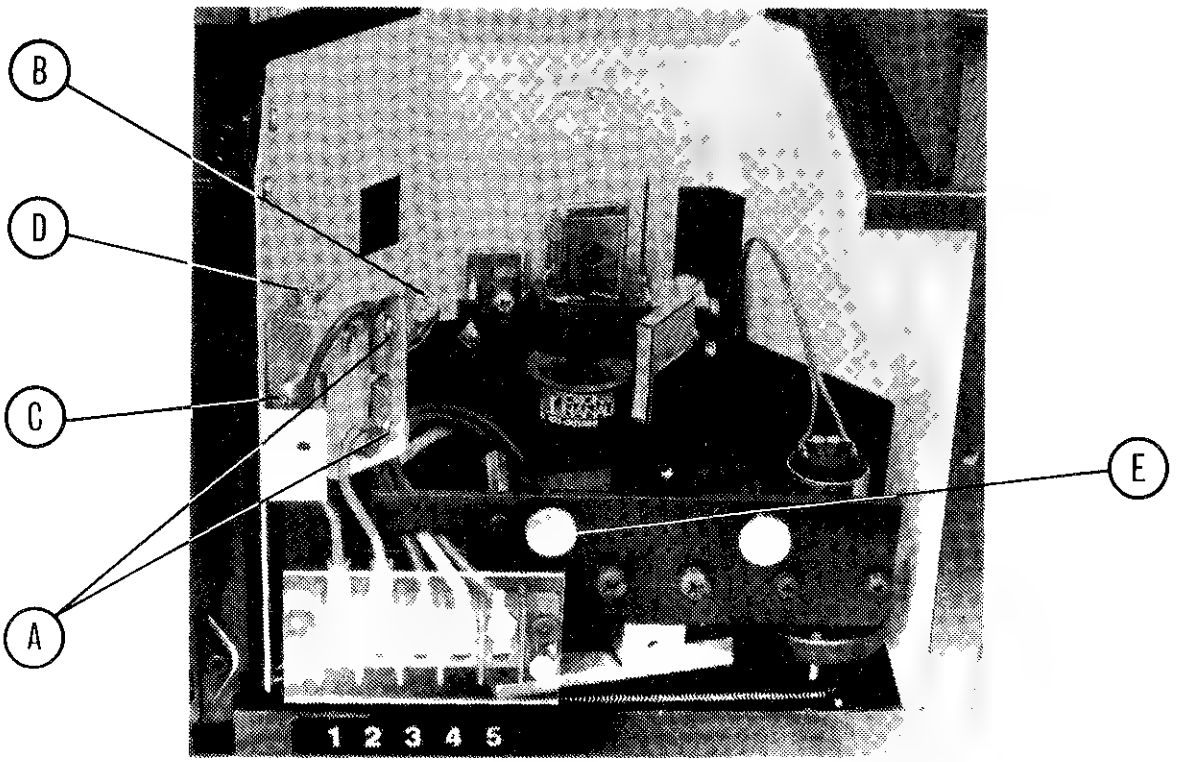
5.1 REPLACING AND ADJUSTING THE HALOGEN LAMP

Halogen lamps operate under pressure and may explode. Protective panels should be provided to protect people and surroundings.
When changing the lamps check the sockets for pitting and replace if necessary.
Lamps should not be touched with bare hands. If the lamp is touched, wipe it clean with a tissue soaked in alcohol.

Replacing procedure:

- Switch off the instrument and pull out the mains plug.
- Remove the cover of the lamp compartment by unscrewing the two knurled screws.
- Loosen the two Phillips screws (A).
  (Screws should only be loosened, not removed.)
- Pull out the defective lamp (B).
- Insert a new lamp.
- Slightly tighten the two Philips screws (A).



5.1 REPLACING AND ADJUSTING THE HALOGEN LAMP (cont.)

Coarse Adjustment

Caution:

To protect your eyes against the bright light, wear dark sunglasses during the adjustment procedure.

- Loosen the locking screw (C) of the lamp holder.
- Switch on the instrument.
- While observing the entrance slit of the monochromator, turn the vertical adjusting screw (D) until the beam spot illuminates the area above the slit to the same extent as the area below the slit.
- With the horizontal adjusting screw (E), center the light beam spot on the slit.

Fine Adjustment

- Select λ-Fix
- Select the %T mode
- Switch off the D2-lamp
- Select the single beam mode
- Select DISPLAY
- Press "auto zero".
  (Display: 100 %T)
- Adjust to maximum %T display, using the lamp-adjusting screws (D) and (E), (the position of the screws should only be slightly changed).

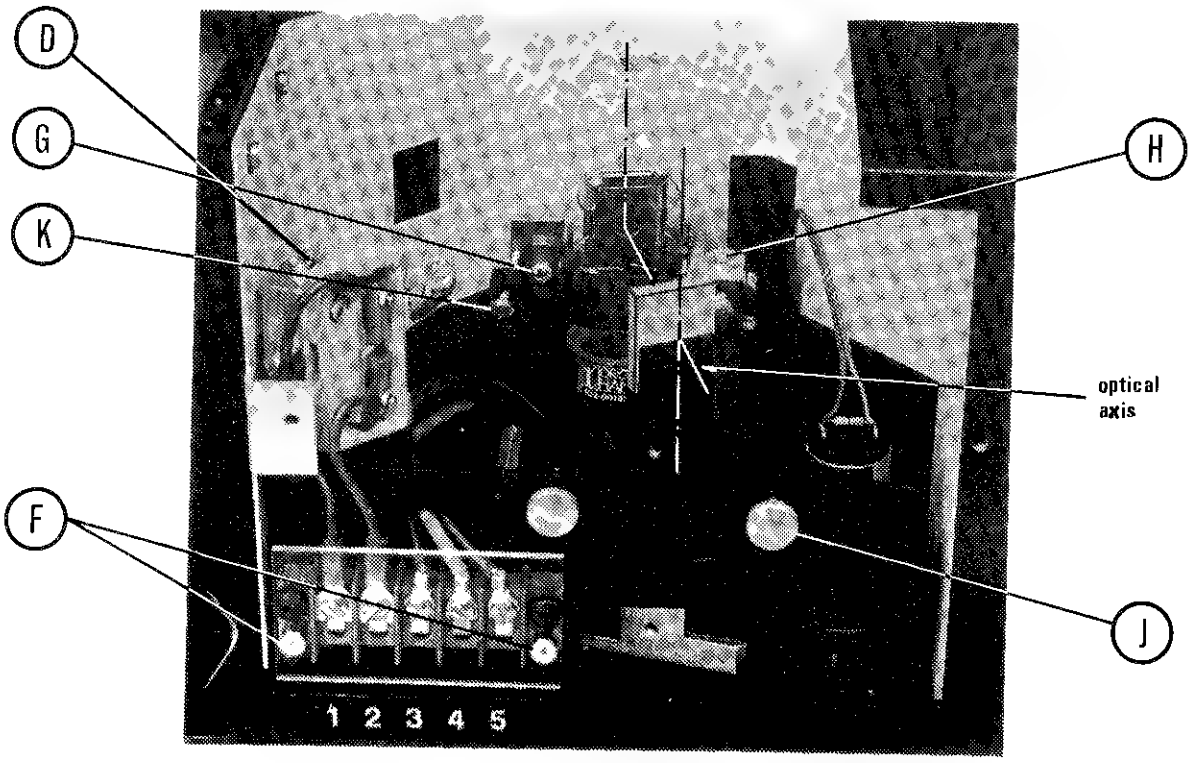
  N.B. If the display exceeds 200 %, "auto zero" must be pressed once again.

- Slightly tighten the locking screw (C).
- Replace the cover of the lamp compartment and tighten the screws.

5.2 REPLACING AND ADJUSTING THE DEUTERIUM LAMP

Never touch the new lamp on the front side, since finger prints greatly reduce the output of the lamp.

- Switch off the instrument and pull out the mains plug.
- Remove the cover of the lamp compartment by unscrewing the two knurled screws.
- Remove the protective cover by loosening the two screws (F).
- Release the connecting cable from the clamps no. 3, 4 and 5. (Screws should only be loosened and the cable connectors pulled out in the upward direction.)
- Loosen the clamp strap by means of the screw (G), and remove the lamp by pulling it out in the upward direction.
- Insert a new lamp and connect the connecting cable to the clamps 3, 4 and 5; the red cable to clamp 4, and the two black cables to clamps 3 and 5. (The clamp strap should only be slightly tightened.)
- Fasten the protective cover with the screws (F).
- Push the lamp upwards so that the bottom edge of the rectangular metal aperture (ca.15x20 mm) within the lamp is flush with the upper edge of the clamp strap. At the same time, turn the lamp so that the round hole of the metal aperture comes to lie on the optical axis between the lamp center and the lamp switch-over mirror.
- Tighten the clamp strap using the screw (G). (Only until the lamp has no sidewards play.)



5.2 REPLACING AND ADJUSTING THE DEUTERIUM LAMP (cont.)

Coarse Adjustment

Caution:

Wear dark sunglasses during the adjustment procedure, to protect your eyes against the light (especially the UV rays).

- Switch on the instrument
- While observing the entrance slit of the monochromator, turn the vertical adjusting screw (H) and the horizontal adjusting screw (J) until the brightest part of the beam spot is centered on the slit.

Fine Adjustment

- Select λ-Fix
- Select the %T mode
- Select single beam
- Switch off H-lamp
- Select DISPLAY
- Set the wavelength to 254 nm
- Press "auto zero" (display: 100 %T)
- Adjust to the maximum %T display using the lamp-adjusting screws (H) and (J), (the position of the screws should only be slightly changed).

N.B. If display exceeds 200 %T, "auto zero" must be pressed once again.

An adjustment of the halogen lamp may additionally be necessary at the lamp switch-over point (λ= 340 nm).

- Set the instrument for double beam operation.
- Switch on the halogen lamp and set the wavelength to 342nm.
- Read the precise %T value and note it down

- Set the wavelength to 338 nm and using the adjusting screw (H) (vertical adjustment of the D2-lamp), set the display to exactly the same %T-value as with the halogen lamp.

- Replace the cover of the lamp compartment and tighten the screws.

N.B. The focussing screw (K) is properly adjusted if it forms a right angle (90°) with the adjoining holder.

5.3 WAVELENGTH-CHECK WITH HOLMIUM-OXIDE FILTER

The holmium-oxide glass contains a number of distinct absorption bands whose wavelengths are exactly known. These bands can be used for a wavelength test of the specrophotometer. In order that the absorption maximum can be read with sufficient accuracy, a spectral bandwidth of maximum 2 nm should be chosen. With a larger bandwidth, the accuracy of reading becomes worse than that allowed by the instrument specifications.

The filter can be ordered as a single filter with the order no. HS-01203.

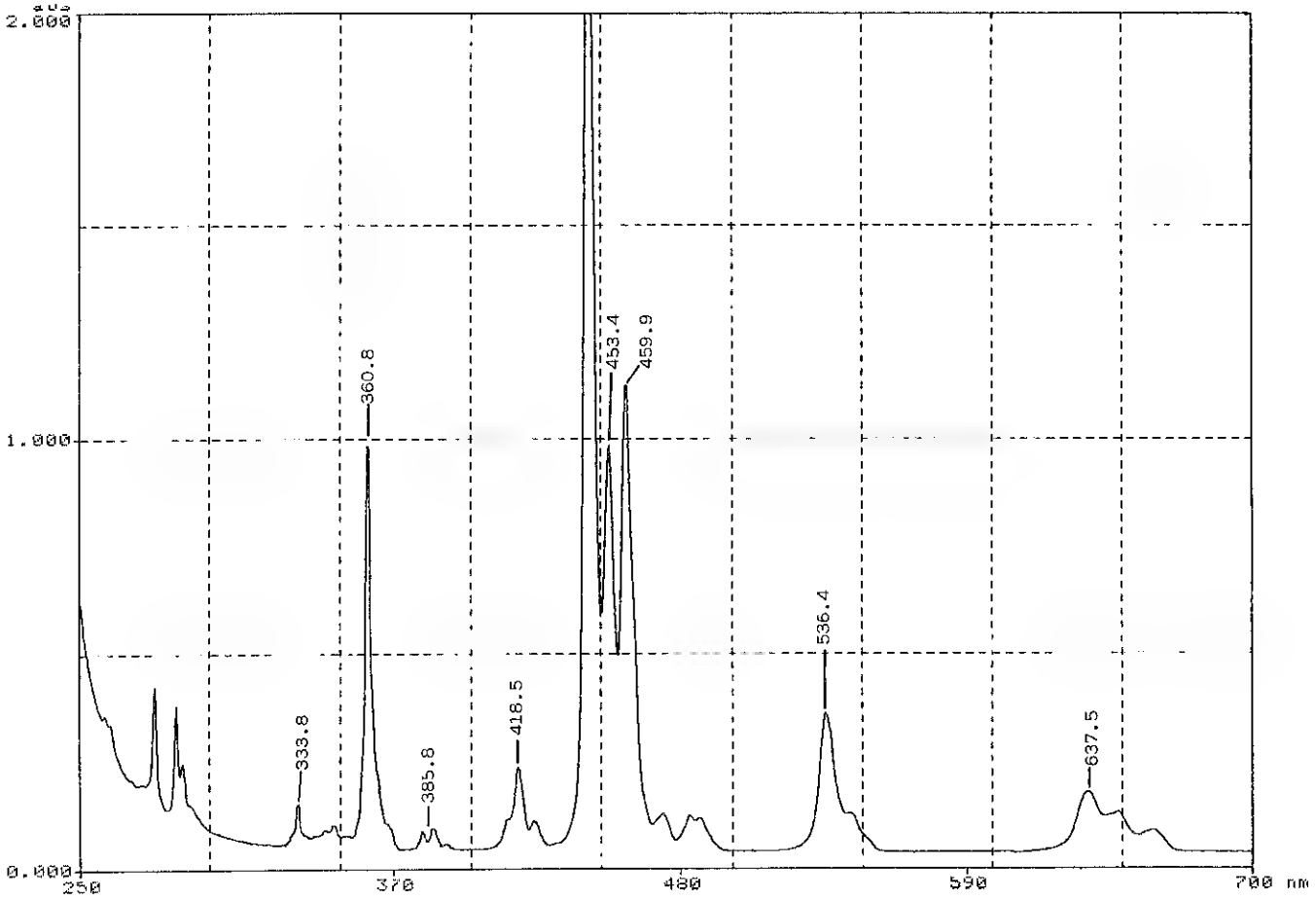


TABLE OF CONTENTS

6.0 OPTIONS AND ACCESSORIES

Instructions, where necessary, are delivered with the accessory. You can file them in this chapter.
The following accessories are available for your UVIKON 860.

Instrument controlled accessories:

The "ACCESSORY INTERFACE KIT" must be installed in order to accept the instrument controlled accessories.

- Accessory interface kit (for all instrument controlled accessories)	91-00455
- 6 position cell changer (cell holders not included)	91-00451
- Gel Scanner for gel-length up to 200 mm	91-00452
- Peristaltic sipper (flow cell not included)	91-00453
- Temperature sensor (measures temperature of the cell holder)	91-00284
- Temperature sensor (measures temperature of circulating water)	91-00273
- Temperature sensor (measures temperature in the cell)	91-00274

Other accessories:

- Accessory for turbid samples with End-on photomultiplier	91-00231
- Cell holder for 5/10/20 mm cells	91-00219
- Thermostatted cell holder for 10 mm cells (needs 91-00233)	91-00223
- Cell holder for cylindrical cells from 10 to 100 mm	91-00225
- Cell holder for rectangular cells 50/100 mm	91-00227
- 6 position cell holder for 5/10/20 mm cells for 91-00451 and 91-00282	91-00228
- Thermostatted 6 pos. cell holder for 10/20 mm cells for 91-00451 and 91-00282	91-00342
- Funnel cell with 10 mm glass flow cell (without vacuum pump)	91-00369

6.0 ACCESSORIES (cont.)

- Tubing entrance for thermostatted cell holders	91-00233
- 6 position manual cell changer	91-00282
- Integrating sphere	91-00247
- 0.5 nm Slit	92-00426
- 1.0 nm Slit	92-00427
- 2.0 nm Slit (standard on UVIKON 860)	92-00428
- 4.0 nm Slit	92-00429
- 2 slits are required	
- Gel-cuvette 100 mm long gelthickness 5 mm, optical glass	K-4-7323
- Gel-cuvette 100 mm long gelthickness 7 mm, optical glass	K-4-7324
- Gel-cuvette 200 mm long gelthickness 5 mm, optical glass	K-4-7325
- Gel-cuvette 200 mm long gelthickness 7 mm, optical glass	K-4-7326
- Vacuum pump for clinical/chemical application 50/60 Hz (not resistant to some organic solutions)	MW-02020
- Didymium filter	HS-01201
- Vycor filter	HS-01202
- Holmium oxide filter	HS-01203
- Deuterium lamp	54-02001
- Halogen lamp	54-03001

OPTIONS

- Automatic slit change mechanism (for retrofit) 0.5 / 1 / 2 / 4 nm	91-00454
- UVIKON 860 (without Software)	99-00325
- UVIKON 860 with multiple slit (without Software)	99-00326

6.1 CELL CHANGER 91-00451

The Cell Changer generates an "Accessory present" signal which produces the message "CELL CHANGER ACTIVE" after power up.
UVIKON 860 then automatically inserts a parameter line for the Cell Changer on the parameter page of the measurement methods.
The parameter line "Cell to measure" is always the last line on the parameter page.

Keep the key  pressed until the page is scrolled and the last line is reached by the cursor.

Cells to measure	1	1 2 3 4 5 6 delete

You can now select any combination of cells. Measurement will always start with the lowest cell number.
The Cell Changer parameter can be stored along with all other parameter in the FILE MEMORY.

6.2 GEL SCANNER 91-00452

Operating instructions

- Switch on UVIKON 860
  The Gel Scanner generates an "Accessory present" signal which produces the message "GEL SCANNER ACTIVE" after power up.

- Remove Slit and Gel from the sample compartment

- Press "START SELF TEST"
  An "OVER FLOW" message might be produced during the SELF TEST, due to a blocked reference beam. However, the instrument will still carry out all operations because the Gel Scanner is only used in single beam mode.

- Set up METHODS page and select TIME DRIVE

- The instrument is ready for operation

Insertion of the slit

- The following slit sizes belong to the gel-scanner accessory:
  0.05 mm (no. 92-00470)
  0.1 mm (no. 92-00471)
  0.2 mm (no. 92-00472)

- Insert desired slit in slit guide so that the cam rests on the slit cover on the sample side.

Insertion of sample holder (cell-and film holder)

- Place sample holder on the gel-scanner carriage with the angled exterior side facing the slit.

- The sample holder is positioned by the two cylindrical pins of the gel-scanner carriage.

- Description of the cell and film holder (see at the end of 6.2).

6.2 GEL SCANNER 91-00452 (cont.)

Gel scanning is done in TIME DRIVE only

- The parameter line "Gel scanner speed" is always the last line on the parameter page.
- Make sure that Beam is set to "single".
- Keep the key  pressed until the page is scrolled and the last line is reached by the cursor.
- The following values are available:

Cell scanner speed	0.5 cm/min	5 4 2.5 2 1 .5 .4 .25 .2

- Select the scanning speed by moving the cursor to the desired value and press "enter".
  The Gel scanner parameter can be stored along with all other parameters in the FILE MEMORY.

Scan direction

- Determine scan direction by pressing the switch to the right of the sample compartment extension in the direction of the arrow.

Measuring process in manual mode "MAN"

- Set the switch left of the sample compartment extension to "MAN"
- Move the gel-scanner carriage to the desired measuring range of the gel by means of the turning knob.
- Select the corresponding scan speed and scan direction.
- Start measuring by pressing the UVISOFT key "RUN".
- The measuring process "RUN" is terminated by the switch on the gel-scanner carriage, or when the Measurement time is reached.
- The run can be broken off by pressing the UVISOFT key "STOP".

6.2 GEL SCANNER 91-00452 (cont.)

Measuring process in automatic mode "AUTO"

- Set switch on "AUTO" (automatic)
- Select scan speed and scan direction
- When the "RUN" is started by pressing the corresponding key, the gel-scanner carriage moves with top speed (5 cm/min) towards the terminal switch opposite. Only upon reaching this switching point will the measuring process be initiated in the scan direction.
- The measurement process "RUN" is terminated by the terminal switch on the gel-scanner carriage, or when the Measurement time is reached.
- Breaking off of a "RUN" (press the UVISOFT key "STOP").

Reproducibility of measurement range

- If the gel in the sample holder is not displaced, the measurement in the "AUTO" mode can be repeated by starting a new "RUN" analog to the first measurement, because the measurement process is always initiated at the same point, as opposed to the "MAN" mode.
  All Gel scanner curves can be used in the calculation methods and they can be used to calculate derivatives, logabs, conversion %T → abs , etc. just like all other TIME DRIVE curves.

Shortening of the measurement distance

- Is only a part of measurement distance used for the measurement, then the distance can be shortened by moving the two carriage stops.
- By unscrewing the two screws with the hexagon pin wrench key (gel-scanner accessory), both stops can be moved by 100 mm. The number of millimeters by which the measurement distance has been shortened can be read on the scales on each side.

6.2 GEL SCANNER 91-00452 (cont.)

Measurement Example

A gel with a length of 4 cm was scanned using the following parameters.

KONTRON UVIKON 860

Date: 12.11.84 Time: 11:42 Operator: F.Furrer.....

Sample Identification: .Sample Gel.....

TIME-DRIVE PARAMETER

Mode	abs	
Wavelength	540.0	nm
Y axis min * max	0.000*4.000	abs
Sampling rate	1000	/min
Measurement time	2.0	min
Cycle #	1	
Cycle time	0.1	min
Spectral bandwidth	2.0	nm
Lamp change	340	nm
W lamp	on	
D2 lamp	on	
Beam	single	
Plotter mode	off	
Chart size	10	cm
Plot X axis incr.	0.5	min
Plot Y axis incr.	0.50	abs
Data to RS 232C	off	
Gel scanner speed	2.00	cm/min

For good resolution use high "Sampling rate" and slow "Gel scanner speed".

6.2 GEL SCANNER 91-00452 (cont.)

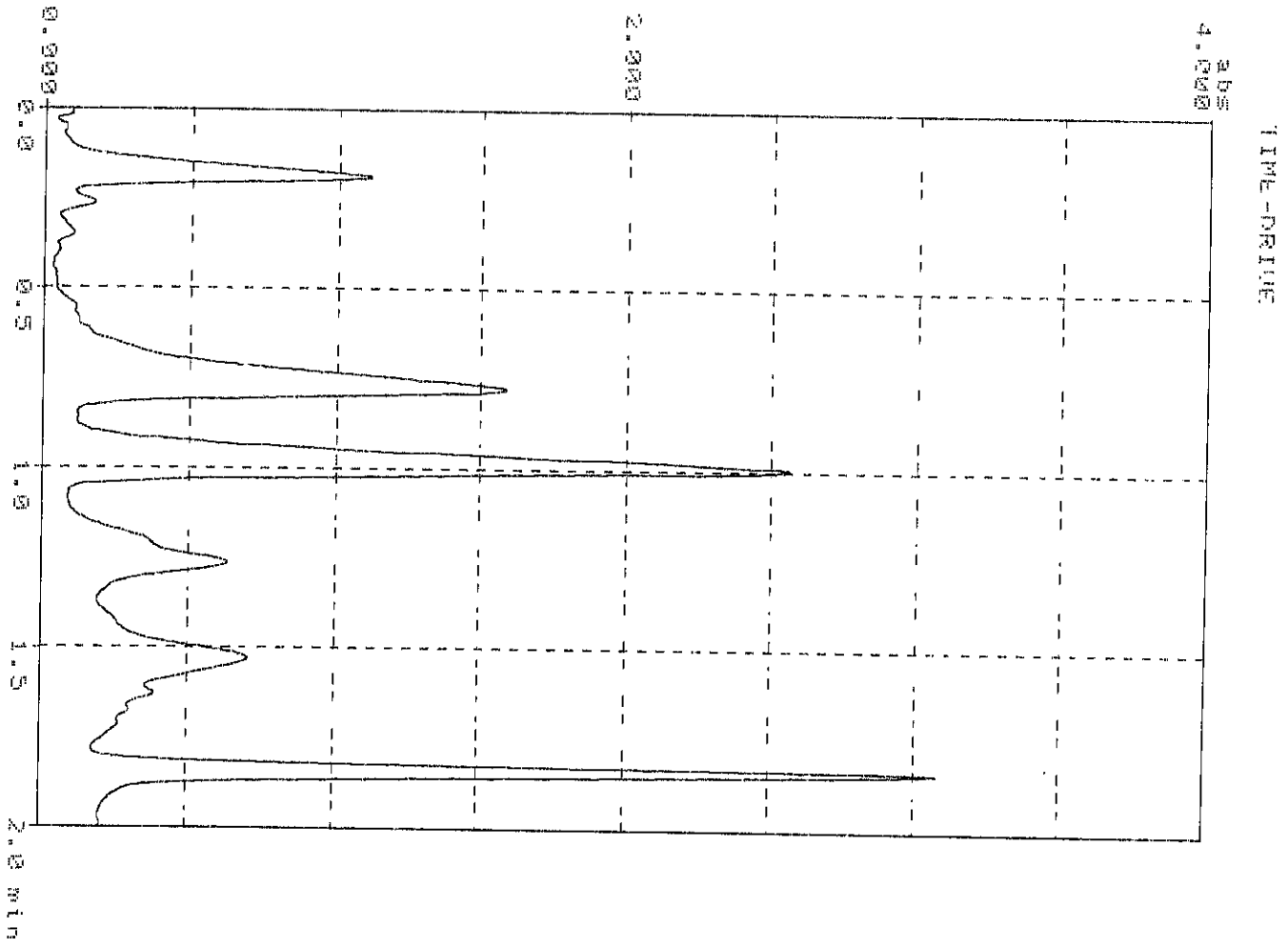
Measurement Example (cont.)

KONTRON UVIKON 860

Date: 12.11.84 Time: 1:40 Operator: F. Furrer

Sample Identification: Gel

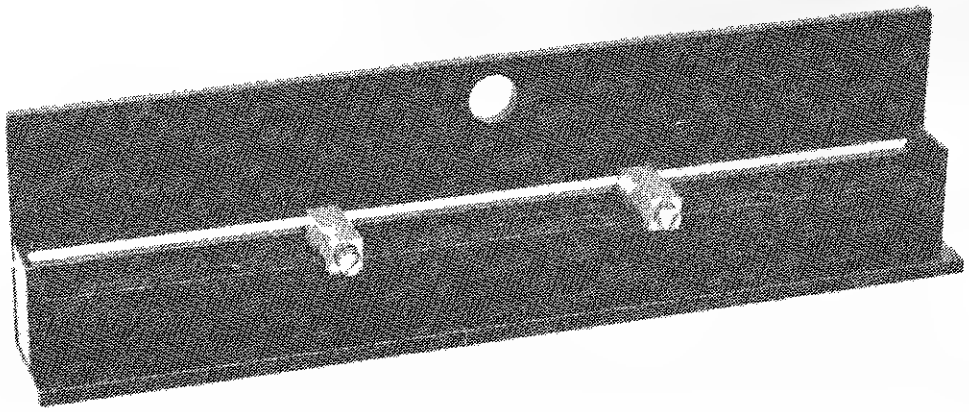
Measurement at 540.0 nm
Auto zero at 540.0 nm
Curve #1601



As the TIME DRIVE method is used for gel scanning, the X axis cannot be calibrated in centimeters. The parameters "Measurement time", "Chart size" and "Plot X axis incr." in the example are set to produce an X axis grid line for all 2.5 centimeters. Therefore, in this example, 0.5 minutes or 2.5 centimeters on the plot are equal to 1 cm of gel.

DESCRIPTION OF CELL HOLDER

The cell holder (89-00117) consists of an angular shaped sample holder, a cell holder equipped on the side with stop plates, and two cell clips installed in the light slit of the sample holder.



Cells of max. 220 mm inside length (measuring path of gel-scanner) or max. 225 mm exterior length (interior width of cell holder) can be used with the cell holder (cell clips removed).

The zero position (starting position for measurement) of the sample in the light beam is set by positioning the cell by the stop plate of the cell holder in the scan direction, with the gel-scanner carriage positioned at the terminal switch. Because the gel-scanner can move in both directions, it is immaterial at which stop measurement starts.

A shortening of the measurement distance is advisable when short cells are in regular use. When doing so ensure that the sample holder can be placed on or removed from the gel-scanner carriage without any difficulties.

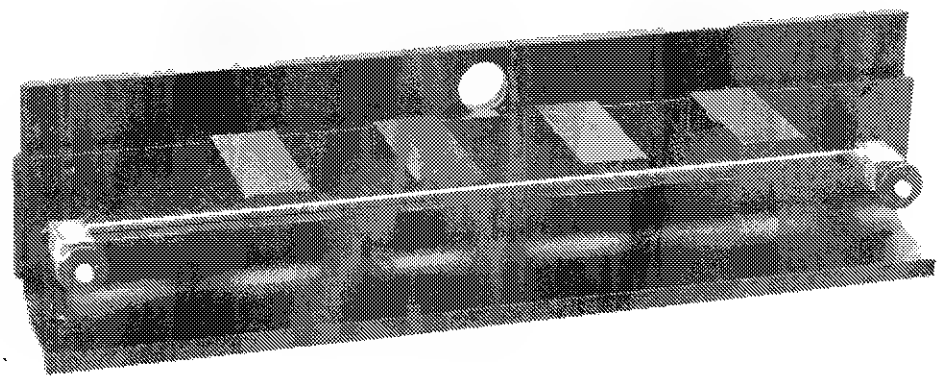
To avoid a displacement the cells can be fixed laterally with the cell clips.

It is recommended to fix one of the cell clips by increasing the spring pressure so that the same stop point remains when the measurement distance has been shortened on both sides.

Place the cell holder with the angular exterior side facing the slit on the gel-scanner carriage.

DESCRIPTION OF FILM HOLDER

The film holder (89-00118) consists of an angular shaped film holder, a film holder strip provided with support angles, and two fixing clips.



Gels of up to 200 mm length can be measured with the film holder.

Loosening of the two fixing clips allows the film holder strip to be raised and the insertion of the gel or of the film.

The gel or the film is held by tightening the fixing clips. Fix the gel in the middle of the film holder.

To avoid a sagging of the film holder strip the fixing clips should be positioned as near as possible to the gel.

Limit the measurement distance with the moveable stops of the gel-scanner carriage.

Since it is possible to drive the gel-scanner in both directions it is immaterial on which side of the film holder the measurement starts (selection of feed direction).

Place the film holder with the angular exterior side facing the slit on the gel scanner carriage.

Slit holder retrofit kit

The gel-scanner 91-00452 is equipped with a slit holder for single beam operation (as standard).

A retrofit kit of slit holder set with its three slit sizes for measurement in double beam operation is available under number 91-00295.

6.3 PERISTALTIC SIPPER 91-00453

Operating instructions

- Switch on UVIKON 860
  The Peristaltic sipper generates an "Accessory present" signal which produces the message "PERISTALTIC SIPPER ACTIVE" on the screen after power up.

- Press "START SELF TEST"

- Two additional parameter lines are available on the parameter page of the measurement methods.

- Keep the key  pressed until the page is scrolled and the last two lines are reached by the cursor.

- Sipper volume

Sipper volume	0.40 ml	0.10≤	≤1.00

Enter the desired sipper volume between 0.1 and 1 milliliter and press "enter".
Note: The sipping volume will depend upon the viscosity of the sample, the construction of the flow-through cell and the inner diameter of the filling tube.

- Stabilizing time

Stabilizing time	3 sec	3 ≤	≤ 10

Enter the desired stabilizing time between 3 and 10 seconds and press "enter".
Note: The stabilizing time will depend upon the viscosity of the sample. The time should be set so that there are no air bubbles in the cell when the measurement starts.

The peristaltic sipper parameters can be stored along with all other parameters in the FILE MEMORY.

6.3 PERISTALTIC SIPPER 91-00453 (cont.)

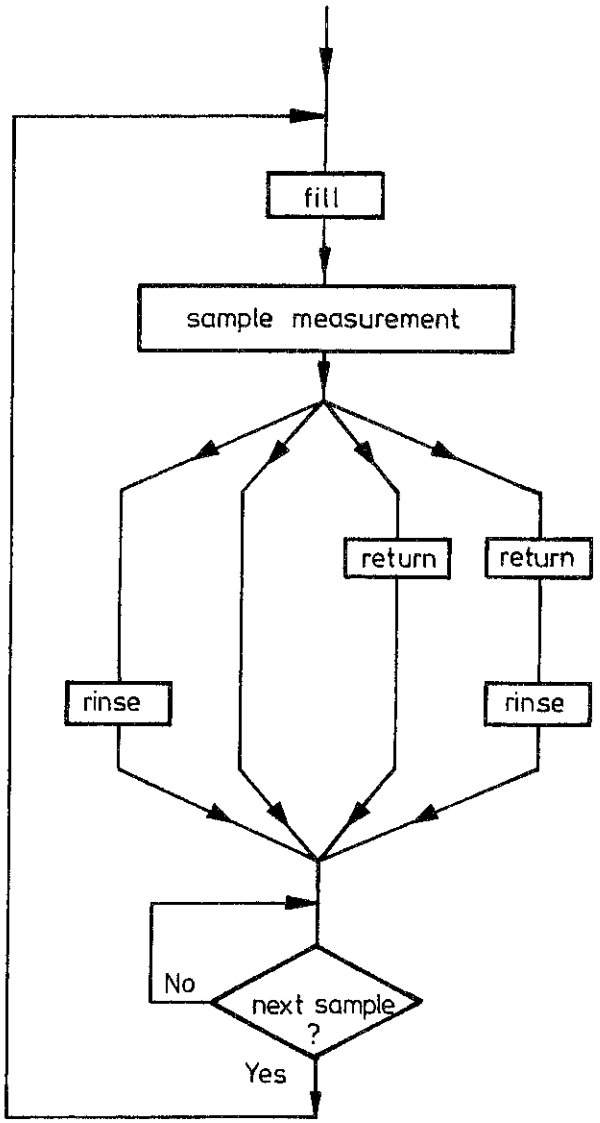
Measuring procedure

- The analytical method parameters should be set on the UVIKON in the usual way (see UVIKON Instruction Manual).
- The peristaltic sipper has control functions:

Filling the cell

By pressing the key "fill" the sample will be drawn into the cell.

Note: At the end of the "sipping time" the "stabilizing time" starts. At the end of this time the measurement on the UVIKON will be started automatically.



Sample return

By pressing the key "return" approx. 90% of the sample is returned.

Note: At the end of the "return time" no measurement starts. Therefore a new function can be started immediately.

Emptying and rinsing the cell

Pressing the key "rinse" causes the sample to be drawn out of the cell and the system to be flushed with solvent. The solvent will flow as long as the key "rinse" is pressed.

6.4 SOFTWARE PACKS

- Software Pack 1 — 91-00478

Measurement methods	Calculation methods
Lambda Scan	Curve overlay
Lambda Fix	Derivative overlay
Lambda Program	Peak detection
Abs/concentration	

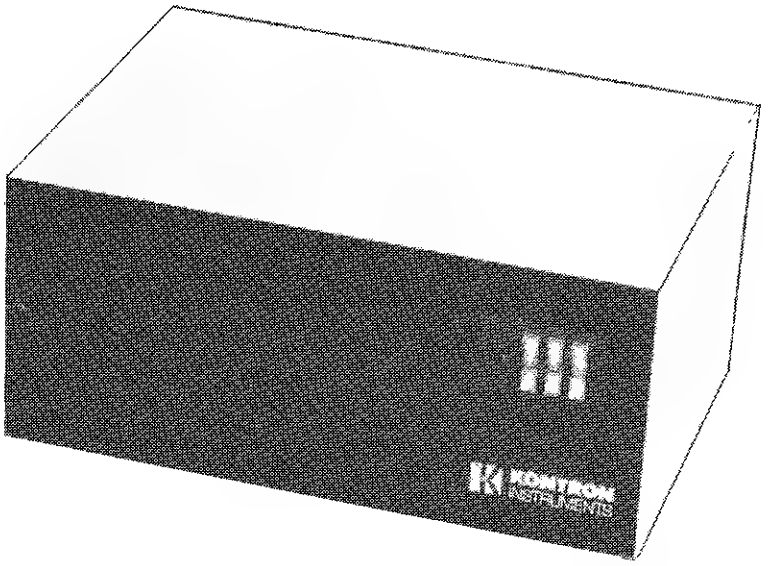
- Software Pack 2 — 91-00479

Measurement methods	Calculation methods
Lambda Scan	Curve overlay
Lambda Fix	Derivative overlay
Time drive	Peak detection
Kinetics	

- Software Pack 3 — 91-00480

Measurement methods	Calculation methods
Lambda Scan	Curve overlay
Lambda Fix	Derivative overlay
Lambda Program	Peak detection
Abs/concentration	Trace / area
Time drive	Curve addition
Kinetics	

KONTRON INSTRUMENTS



UVIKON

Thermo Controller 91-00458

Instruction manual

THERMO CONTROLLER INSTRUCTION MANUAL

TABLE OF CONTENTS

1. W A R N I N G S

- CHECK THE OPERATING VOLTAGE

  THE SELECTOR UNIT IS DESCRIBED IN CHAPTER 3

- ALWAYS DISCONNECT THE MAINS BEFORE STARTING ANY WORK

  INSIDE THE INSTRUMENT.

2. CONTENTS OF DELIVERY

Items	Description	Part no.
1	Thermo controller	91-00458
1	Screw driver for Trimmpot	40-39005
1	Mains cord "Schuco"	55-65601
-	Mains cord CH	55-65602
-	Mains cord USA	55-65605
1	Instruction	84-00235
1	Peltier cable	93-00670

3. INSTALLATION

There are different kinds of cell holders, which can be installed. Therefore the corresponding installation instruction will be supplied with the respective option.

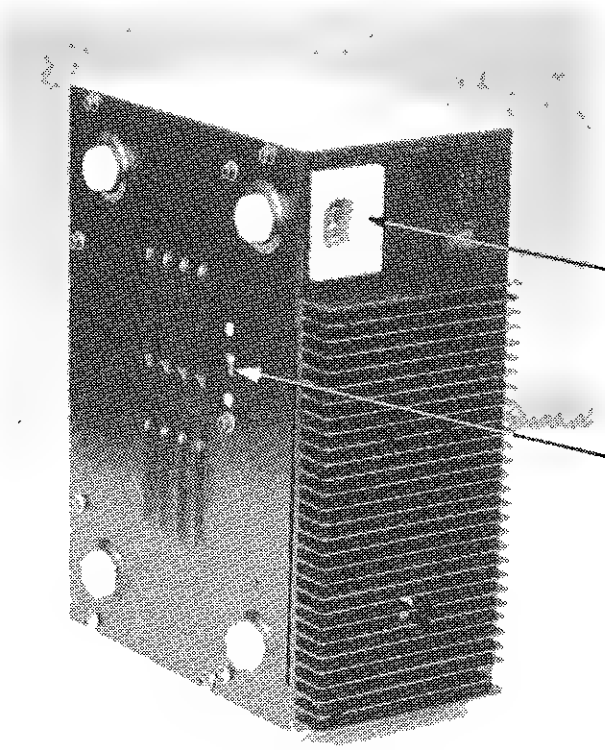
3.1 CHECKING THE MAINS SUPPLY

The thermo controller is factory set to 220V, 50/60 Hz. For operation with other mains voltages, the correct voltage must be set on the voltage selector. (see fig.)

Possible settings:

Mains voltages	Position of selector	Fuse value
100, 110, 120 V AC	110 V	2 x 2A slow blow
200, 220, 240 V AC	220 V	2 x 1A slow blow

Frequency adjustment is not required



FUSES: If necessary insert the correct fuse (see table)

VOLTAGE SELECTOR
The shown value must agree with the mains voltage.

4. INSTRUMENT DESCRIPTION

4.1 SPECIFICATION

Thermo controller

Temperature range:	0 ... 49.9 °C
Temperature accuracy (adjustable)	better than 0.1 °C
Temperature precision:	better than 0.05 °C
Temperature ripple:	less than 0.05 °C
Operating voltage:	100,110,120,200,220,240V
Operating frequency:	50/60 Hz

Peltier cell changer

* Temperature range:	15.0 ... 49.9 °C
Temperature accuracy: (measured in pos. 3, between 20,0 and 49,9 °C)	better than 0.1 °C
Temperature precision:	better than 0.05 °C
Cooling rate:	more than 4 °C/min
Temperature agreement between cell position:	better than 0.5 °C
Cells:	standard 10 x10 mm

Micro flow cell

* Temperature range:	20,0 ... 45,0 °C
Temperature accuracy:	better than + 0.1 °C
Temperature precision:	better than + 0.05 °C
Cooling rate:	more than 10°C/min
Sample volume:	10 ul

* Temperature range in reference to 20-35 °C ambient temperature. To lower the temperature in the cell holder, the ambient temperature must be lowered.

4.1 SPECIFICATION (cont.)

Double beam cell holder

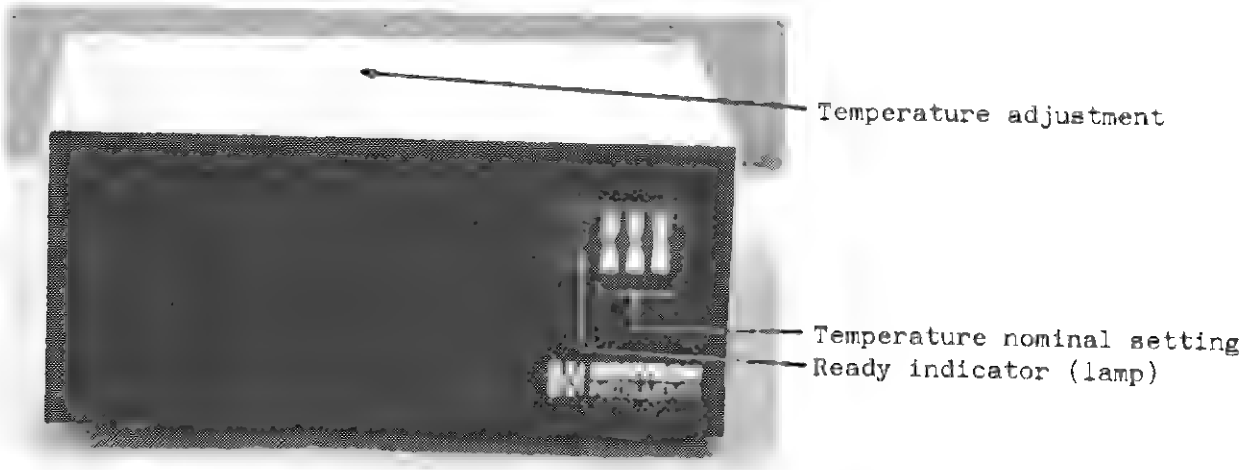
* Temperature range:	15,0 ... 45.0 °C
Temperature accuracy:	better than + 0.1 °C
Temperature precision:	better than + 0.05 °C
Temp. agreement between cell holders of sample channel and reference channel:	better than 0.5 °C
Cooling rate:	more 4 °C/min

* Temperature range in reference to 20-35 °C ambient temperature.
To lower the temperature in the cell holder, the ambient temperature must be lowered.

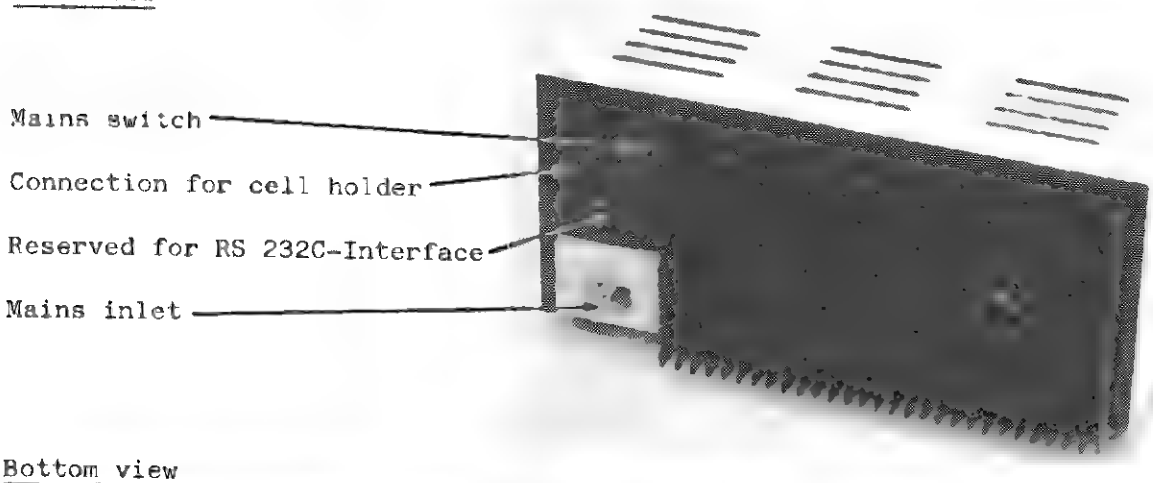
4.2 CONSTRUCTION OF INSTRUMENT

Thermo controller

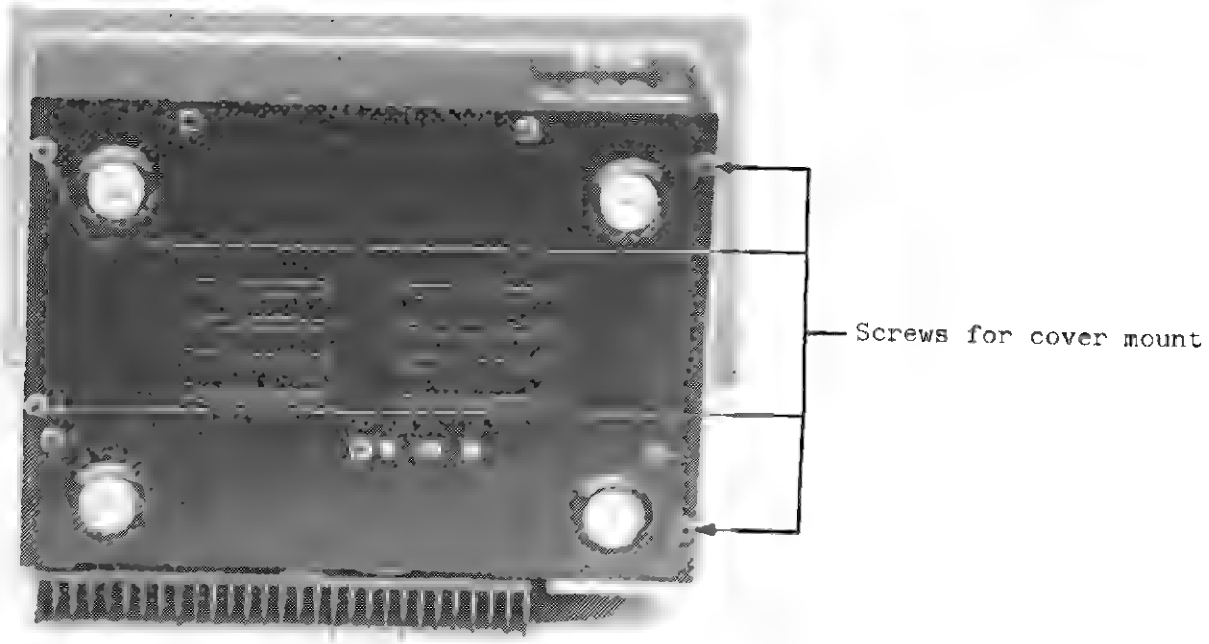
Front view



Rear view

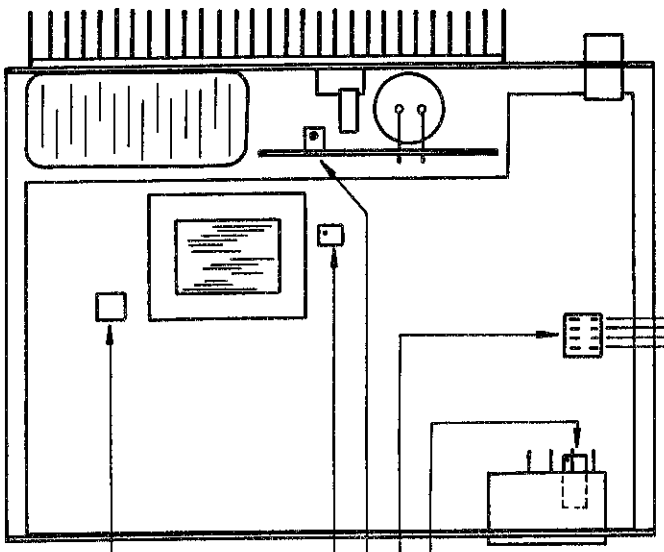


Bottom view



4.2 CONSTRUCTION OF INSTRUMENT (cont.)

Birds view (without cover)



Operating modes

S1	S2	S3	S4	
0	0	0	0	Standard Program
1	0	0	0	RS 232C-Operation
0	1	0	0	Service 1
1	1	0	0	Service 2

Other combinations are not defined

Measuring socket for error codes

Switch for operating modes

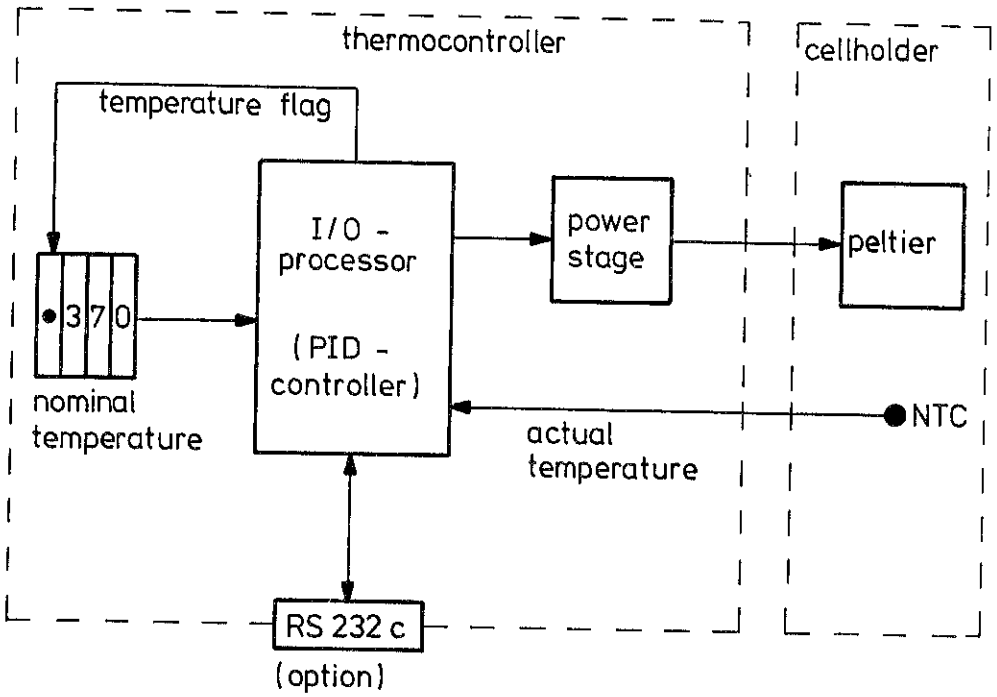
Adjustment for temperature

Adjustment for idle current

Reset switch

4.2 CONSTRUCTION OF INSTRUMENT (cont.)

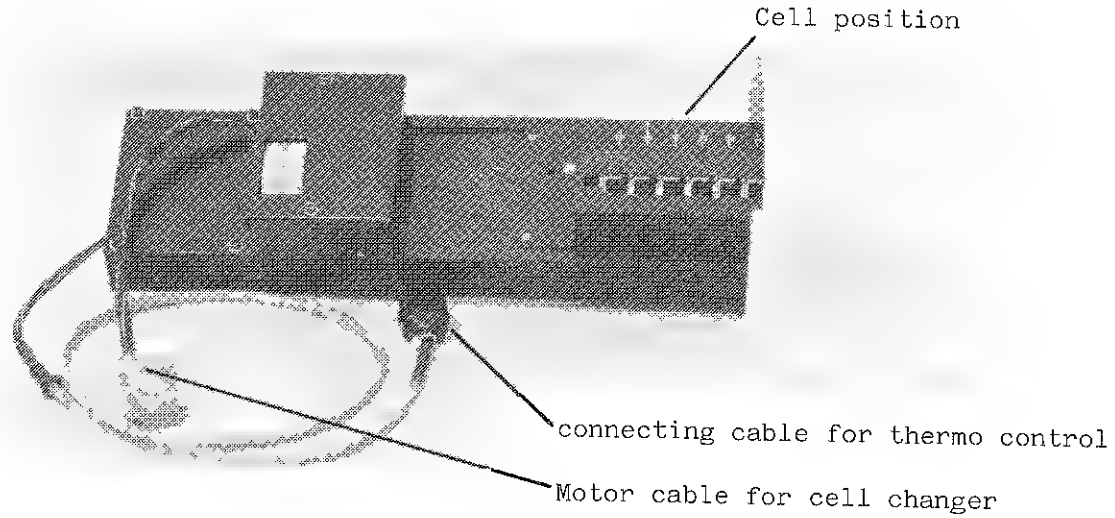
Functional block



Functional description

The nominal value of the temperature is read by the I/O processor and compared with the digital value of the actual temperature. The PID-regulator adjusts the temperature inside the cell changer via Peltier driver stage and Peltier element. The indicator is continuously lit, when the difference (θ nom - θ act) is less than 0.1 °C.

Peltier cell changer



The cell changer is operated from the keyboard of the UVIKON.

5. OPERATING INSTRUCTION

5.1 INITIAL START UP

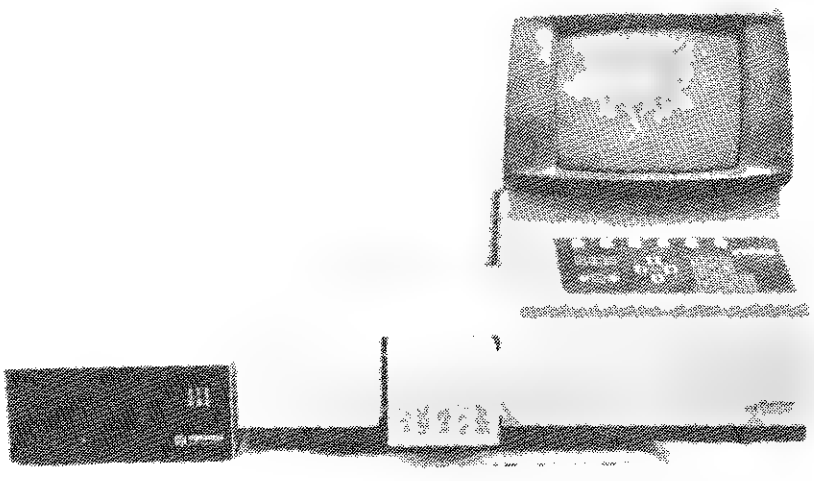
- Install the cell holder into the UVIKON
  Connect all cables between Thermo control, Cell holder, UVIKON and mains. (see chapter 3)

- Switch on the UVIKON

- Switch on the Thermo controller and set the desired temperature.

- The indicator lamp on the thermo controller is flashing slowly (approx. ones every 2s) until the set temperature is reached.
  If the indicator is blinking fast (approx. 5 times in 1s), then an error is detected. In that case see in the "TROUBLE SHOOTING" section.

5.2 For the basic operation see chapter 3, for operation with options see chapter 6, in the instruction manual of UVIKON 860.



5.3 TEMPERATURE ADJUSTMENT

The thermo controller is in combination with a cell holder (Peltier cell changer, micro-flow cell or double beam cell holder) factory adjusted to ± 0.2 °C. A more accurate adjustment can be done with the adjustment screw underneath the cover sheet of the thermo controller.

Since the thermo sensors in the cell holders are highly precise, it is sufficient to have a one point calibration near the most used working temperature.

6. TROUBLE SHOOTING

The thermo controller has a built in self test.
It basically differenciates between two kinds of errors:

- Operator errors
- Hardware errors

A faulty condition is generally shown by a fast flashing indicator light (approx. 5 Hz). The real error codes are available on the measuring socket. The detailled description is in the Service manual.

The basic procedure for fault finding is:

a) Indicator is blinking fast (5 Hz)
b) Check for possible fault
c) Switch thermo controller off
d) Eliminate the fault
e) Switch thermo controller on

It is necessary to switch the thermo controller off, in order to reset the ERROR condition.

6.1 OPERATION AND PERIPHERIAL FAULTS

ERROR	POSSIBLE REASON	ELIMINATION
Blinking fast (5Hz) after switch on	Wrong working mode (see Service manual)	- Switch off instrument - Remove cover of thermo controller - Set the mode switches to the desired mode.
	- Cable between Cell holder and Thermo controller not connected - Cable between Cell holder and Thermo controller defective. - Wrong Cell holder	- Switch off instrument - Check Cell holder and cable
Blinking fast (5Hz) 10 min after switching on or 10 min after tempe-rature setting	- Nominal temperature has not been reached within 10 min - Nominal temperature too low	- Switch off instrument - Set higher nominal temp. or else, the ambient temperature must be lower
	- Heatsink on rear wall overheated (Overtemp. switch on)	- Switch off instrument - Let it cool to ambient temperature
	- Cell holder or Peltier driver stage defective	- Switch off instrument - Let it cool to ambient temperature - If there is no respond to a new temperature setting, then call your Service Represen-tative.

6.2 HARDWARE FAULTS

If none of the mentioned hints can solve the problem, then it's most probably a defect in the electronics.

- Call your Service Expert.

7. OPTIONS

7.1 CELL HOLDER

Following cell holders are available:

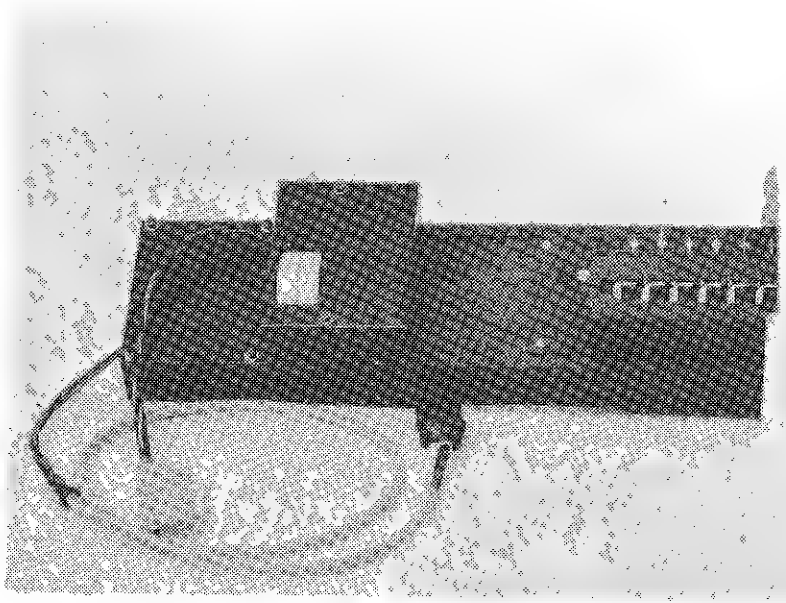
Peltier - Double beam cell holder	PN 91-00521
Peltier - Micro-flow cell 10 ul	PN 91-00522

7.2 RS 232C - INTERFACE (in preperation)

The Thermo Controller can be retrofitted with a RS 232C-Interface.

Via this interface the nominal temperature can be set and the actual temperature be read.

KONTRON INSTRUMENTS



UVIKON 860

Peltier 6pos. Cell Changer

91-00457

Instruction

This instruction contains basically the installation of the Peltier 6pos. cell changer 91-00457 to UVIKON 860.

The operating instructions are in the UVIKON 860 Instruction manual, chapter 6.1 and 6.4.1

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1. UNPACKING AND INSPECTION

Check the delivery for completeness and condition. If anything is missing or damaged inform your KONTRON representative immediatly.

List of delivered items:

Items	Description	Part No.
1	Peltier 6pos. Cell Changer	91-00457
1	Hex screw driver 2.5 mm	40-30009
1	Fan compl.	93-00582
4	Screw	22-74010
4	Nut	24-64008
4	Washer	32-61011
4	Spring washer	32-44011
1	Instruction Peltier Cell Changer	84-00218
*	Air duct (on special order only)	68-01384

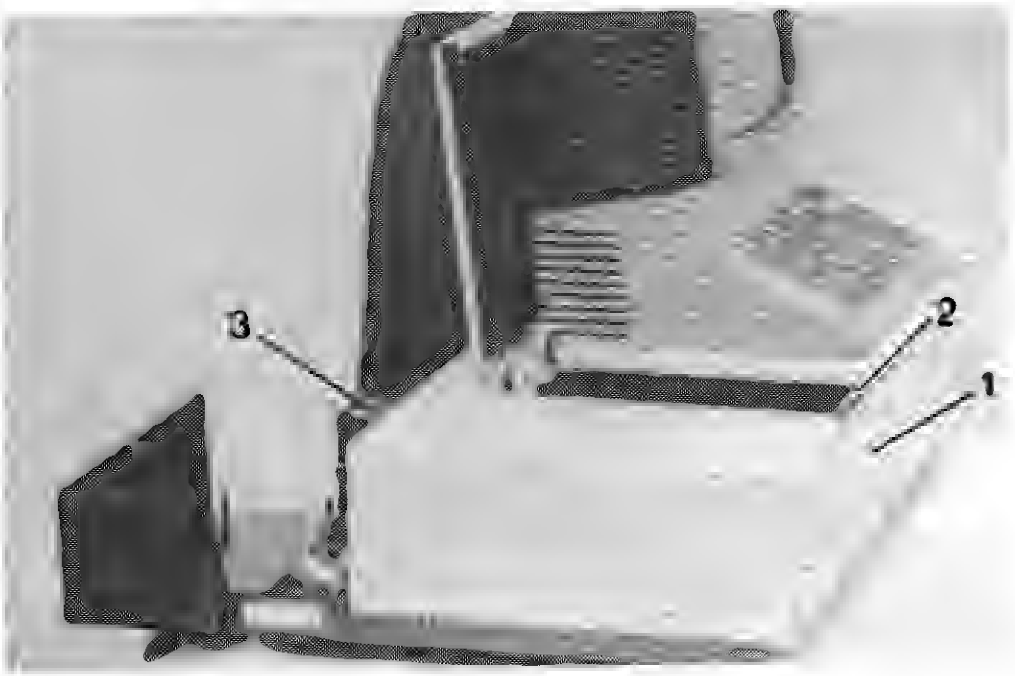
* Migth be needed on previous delivered Accessory Interface Kit 91-00455

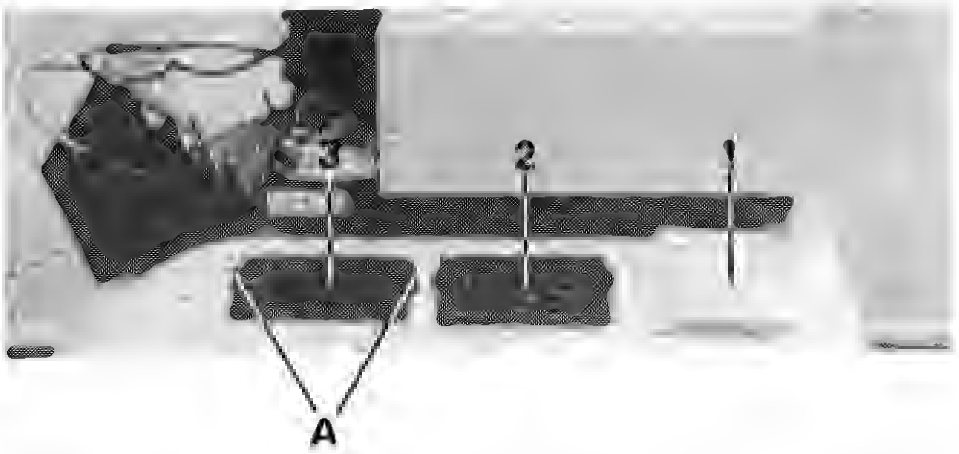
For the installation, the following tools are needed:

- Hex screw driver with handle 2.5 mm
- Hex screw driver with handle 3 mm
- Fork wrench 7 mm

2. PREPARATION OF UVIKON 860

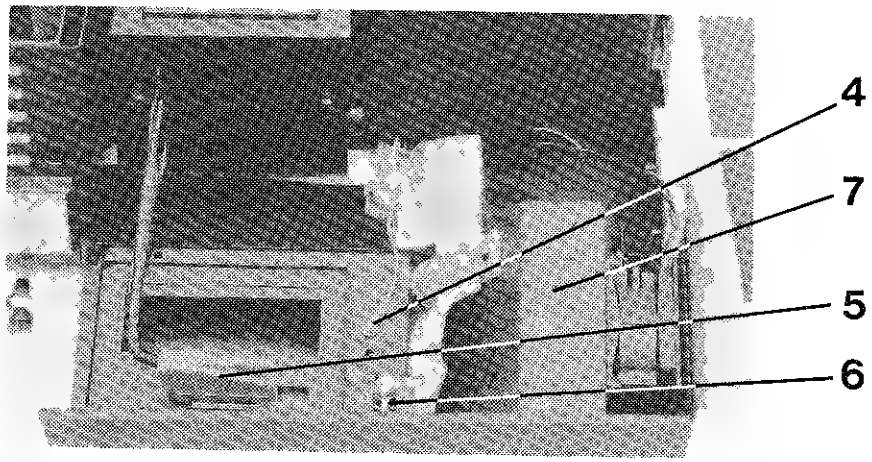
- Switch power off and unplug the mains cable.
- Open the snap cover on the rear side and open the sample compartment cover.
- Remove cell holder or other accessories from the sample compartment.
- Remove the white front panel (1) by pulling it up.
- With the hex screw driver 2.5 mm unscrew the 2 M3-screws and then remove the black front plate (2). On the rear side of the sample compartment unscrew the 2 screws (A) and remove the rear cover (3).





2. PREPARATION OF UVIKON 860 (cont.)

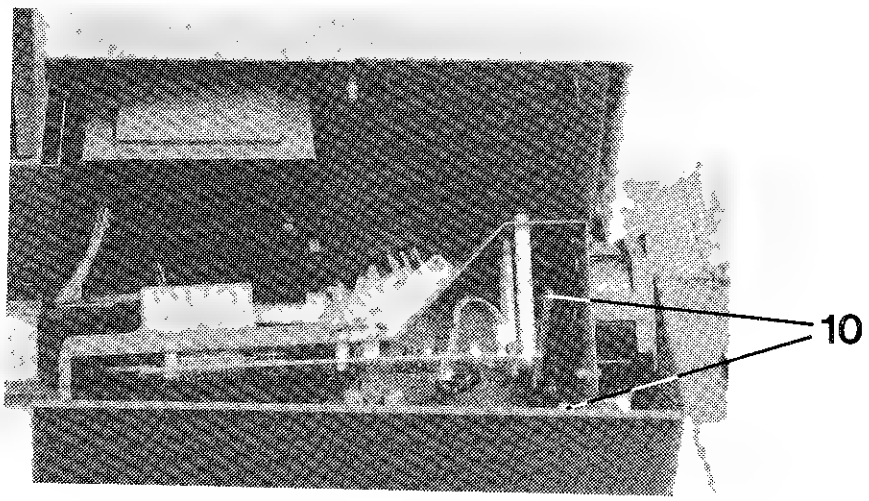
The sequence of preparation varies somewhat, depending of the type of Accessory Interface fitted.



a) Interface without air duct was installed:
- Remove earth wire (4)
- Unplug the cables at (5) and (6)
- Using the hex screw driver 3 mm unscrew the 5 screws M4 and remove the Accessory Interface (7).
- Remove the interface board (94-00845) and mount it to the new air duct, PN 68-01384.
- Mount the 2 spacers (10) to the threaded standoffs.
- Proceed with fan mounting

b) Interface with air duct was installed:
- Using the hex screw driver 3 mm unscrew the 5 screws M4 and remove the Accessory Interface (7).
- Proceed with fan mounting

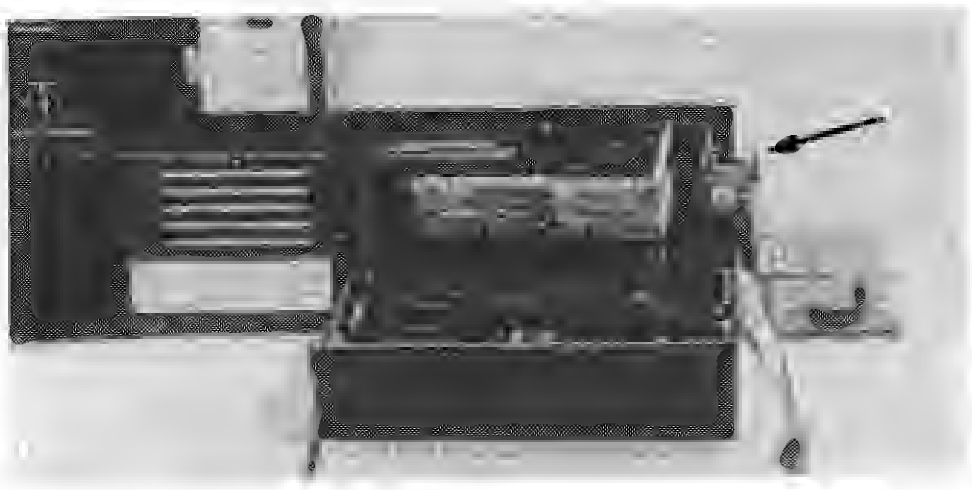
c) No interface is installed
- Mount two spacers (10) to the threaded standoffs using the 7 mm fork wrench.
- Proceed with fan mounting
- For installation of Accessory Interface 91-00455 see also instructions in Options chapter 9.5.



2. PREPARATION OF UVIKON 860 (cont.)

Fan mounting

- Mount the fan assembly to the air duct, using the 4 screws, washers, spring washers and nuts provided.



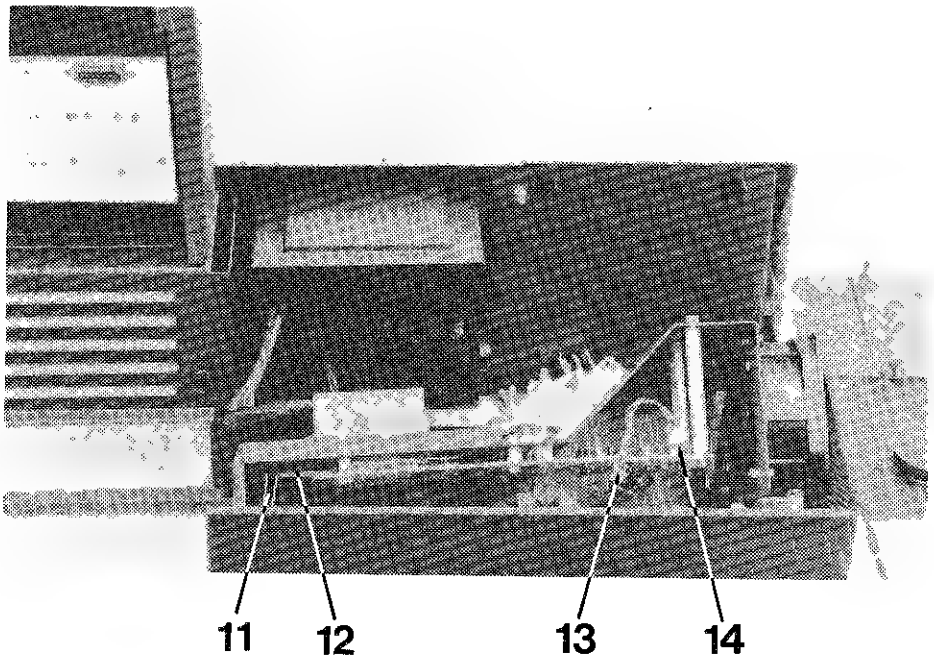
3. MOUNTING OF PELTIER CELL CHANGER

- Insert the Peltier cell changer (8) in arrow direction into the sample compartment until it is in line with the sample compartment end.
- Remove the transparent safety plug (9) and fix the Peltier cell changer using the hex driver 3 mm
- Mount the safety plug again and close the cover of the sample compartment.

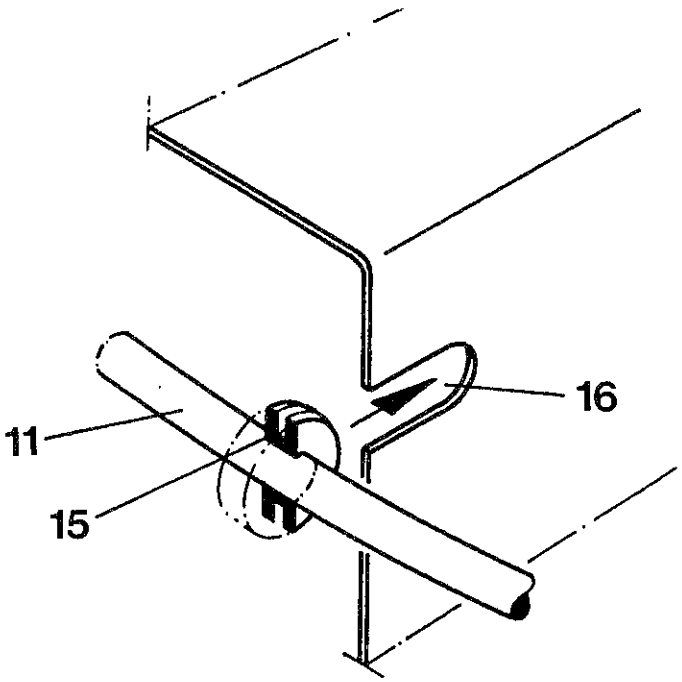
3. MOUNTING OF PELTIER CELL CHANGER (cont.)

- Slide the peltier cable (11) (93-00670 delivered with Thermo controller) thru the large opening on the air duct. Fix it on cable clip (12) on the back side of the air duct.

- Slide the supply cable (13) thru the hole on the air duct lower side and connect the 2-pole plug to the accessory board (14).

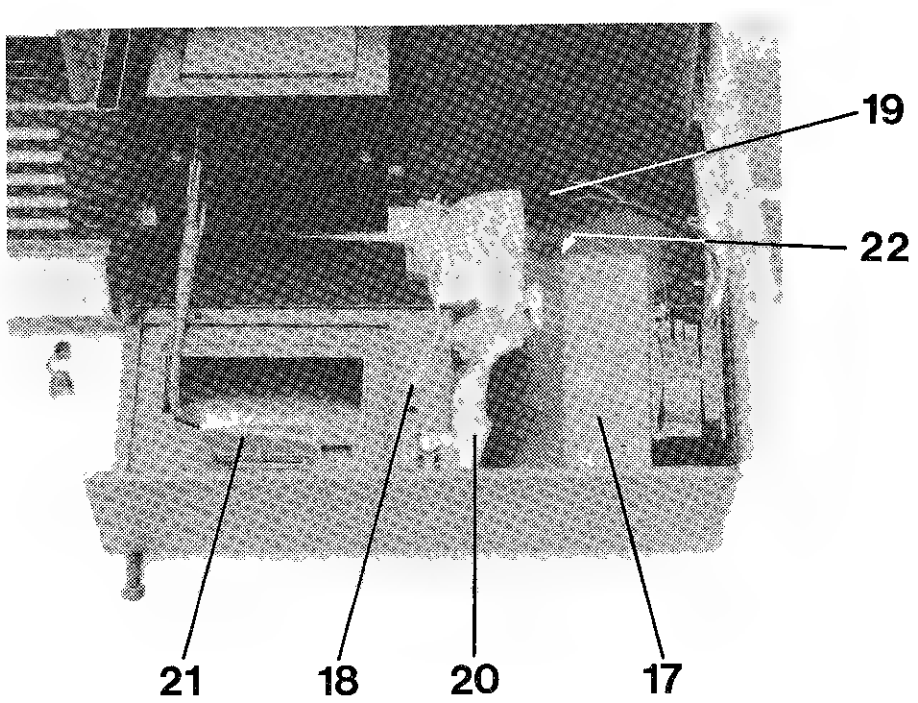


- Shift the grommet (15) of the peltier cable (11) into the slot (16) on the snap cover.



3. MOUNTING OF PELTIER CELL CHANGER (cont.)

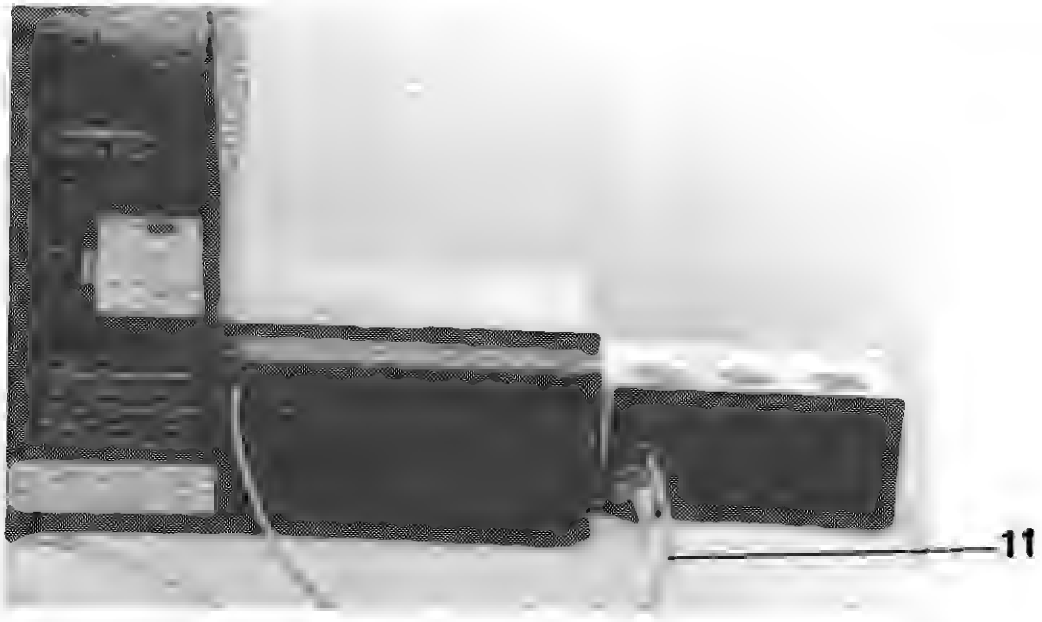
- Mount the Accessory Interface 91-00455 (17) to the threaded standoffs using 5 screws M4 and washers.
- Connect the earth wire (18) using the 7 mm fork wrench.
- Plug in the fan connector (19), ribbon cable (20), and the accessory connector (21).
- Slide the grommet (22) over the supply cable and press it into the hole on the lower side of the air duct.



- Carefully close the snap cover

ATTENTION: Do not squeeze in any cables !

3. **MOUNTING OF PELTIER CELL CHANGER** (cont.)

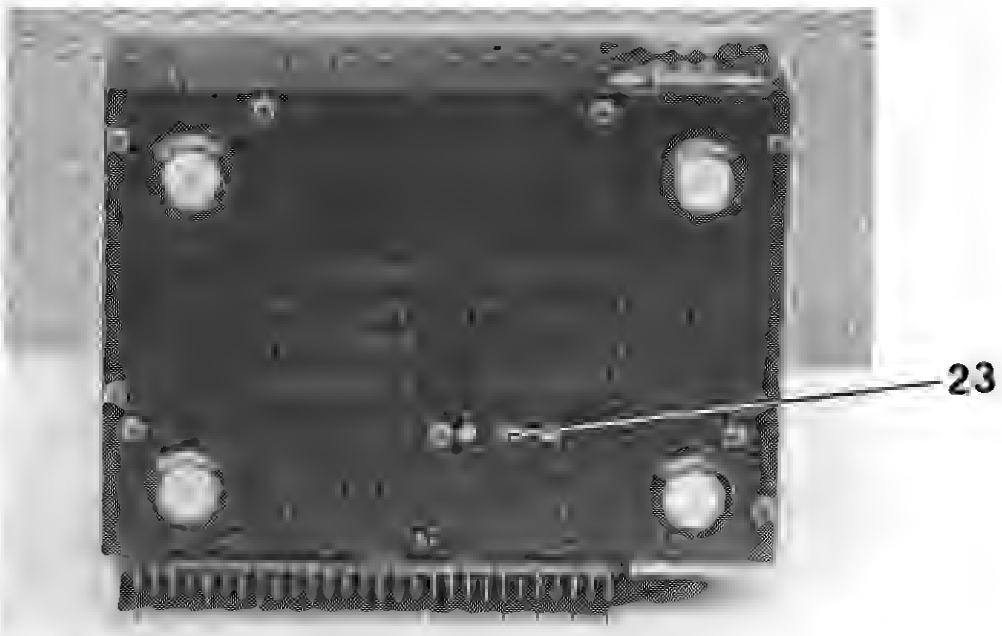


- Connect the peltier cable (93-00670) (11) to the Thermo controller 91-00458.

- Check the voltage setting on the base of the Thermo controller. If necessary set the selector (23) to the appropriate voltage 115 or 220V AC using a screw driver.

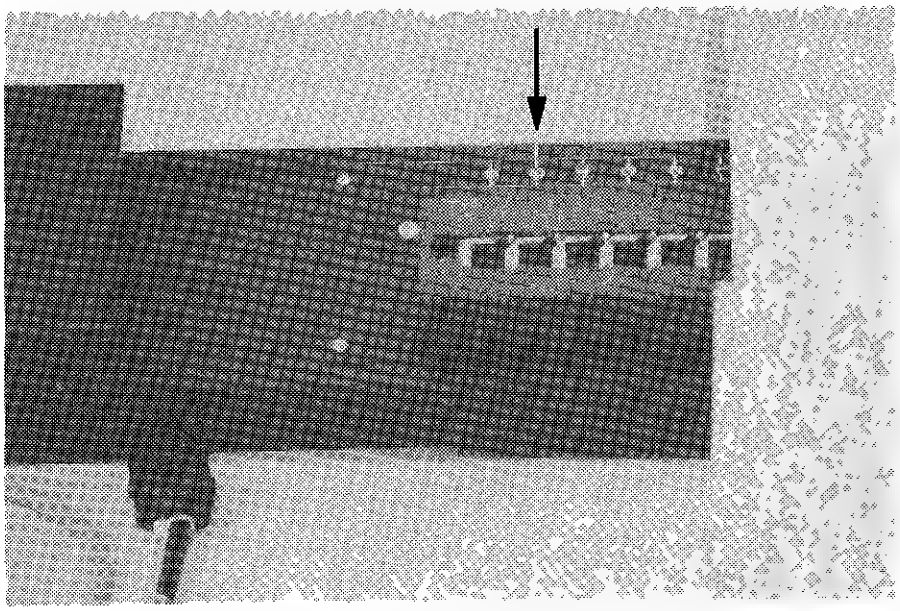
- Connect the mains cables of UVIKON 860 and Thermo controller to the mains outlet and switch power on.

- The Peltier cell changer is ready to operate.



4. DEMOUNTING OF THE PELTIER CELL CHANGER

- Position the cell changer via keyboard of UVIKON 860 to position 5.
- Switch power off on UVIKON 860 and Thermo controller.
- Unplug both mains cables.
- Then proceed basically in reverse order as by mounting of the Peltier cell changer.



KONTRON INSTRUMENTS

UVIKON 860

Peltier Cell Holder

91 - 00521

Instructions

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1. UNPACKING AND INSPECTION

Check the delivery for completeness and condition. If anything is missing or damaged inform your KONTRON representative immediatly.

List of delivered items:

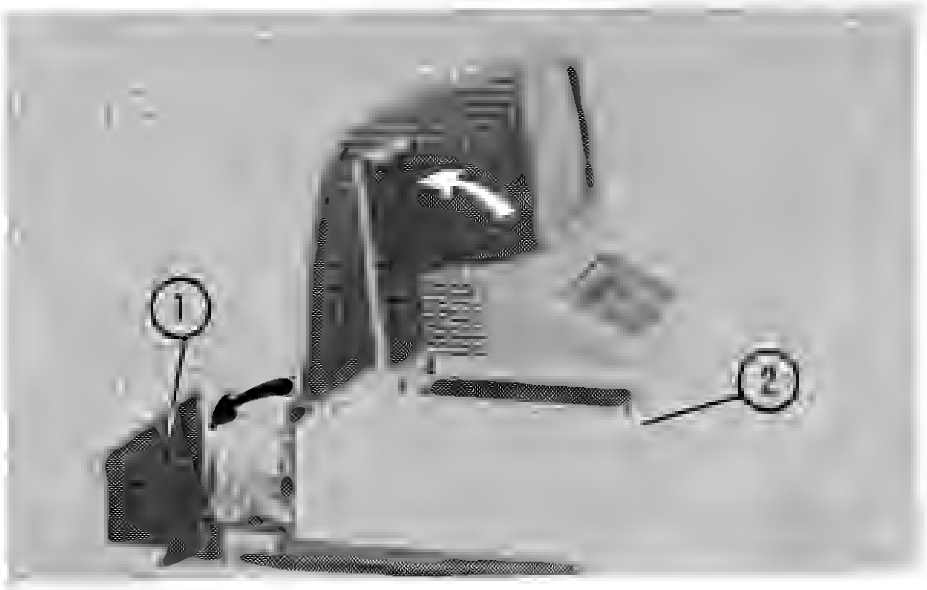
Items	Description	Part No.
1	Peltier Double Beam Cell Holder	91-00521
1	Hex screw driver 2.5 mm	40-30009
1	Fan compl.	93-00582
4	Screw	22-74010
4	Nut	24-64008
4	Washer	32-61011
4	Spring washer	32-44011
1	Instruction Peltier Cell Holder	84-00236

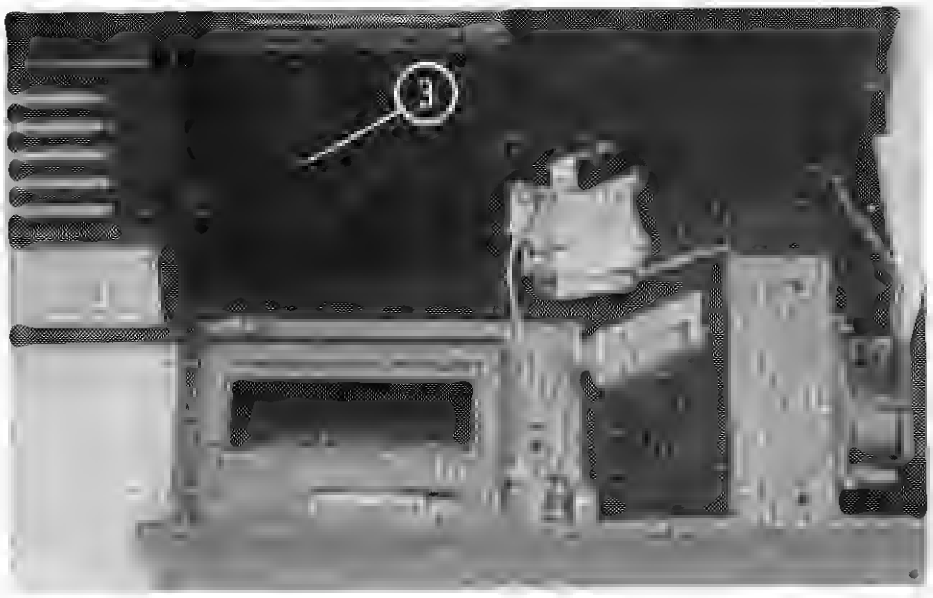
Tools required:

- Hex screw driver with handle 2.5 mm
- Hex screw driver with handle 3 mm

2. PREPARATION OF UVIKON 860

- Switch power off and unplug the mains cord.
- Open the snap cover (1) on the rear side and open the sample compartment cover.
- Remove cell holder or other accessories from the sample compartment.
- Remove the white front panel (2) by pulling it up.
- Remove black plug (3), on the rear cover of the sample compartment.

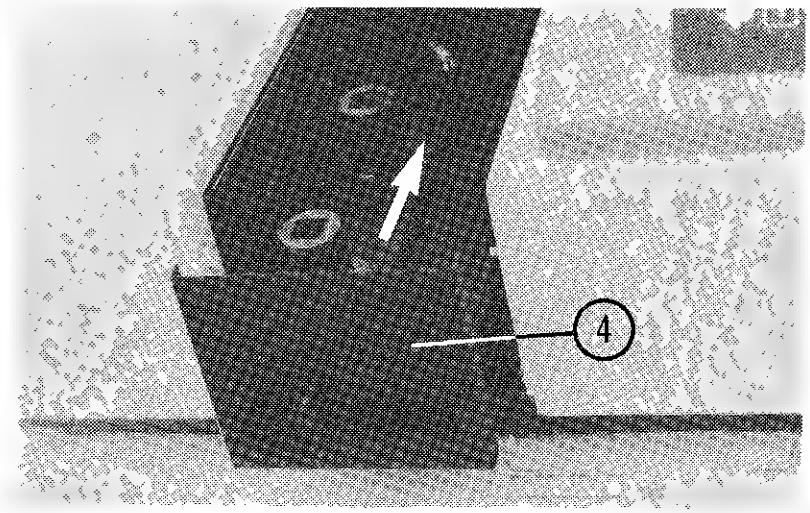


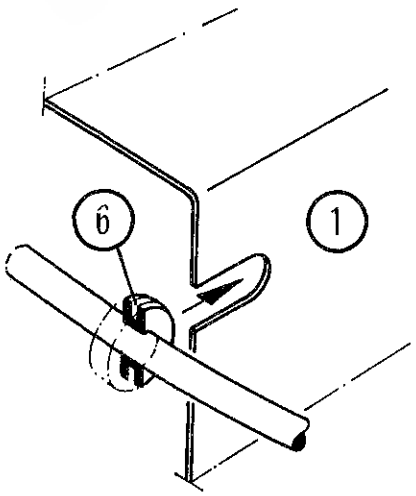


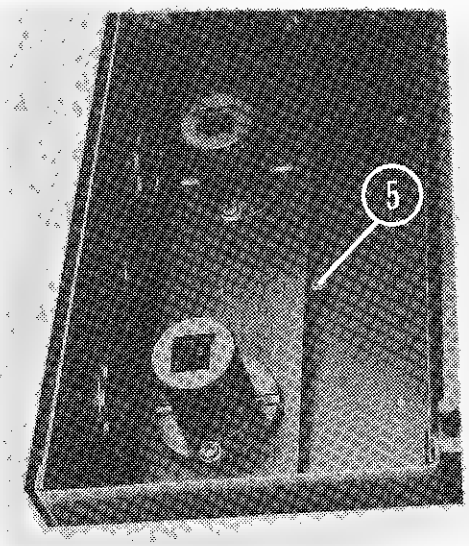
3. INSTALLATION OF THE PELTIER DOUBLE BEAM CELL HOLDER

- With the cable end ahead insert the Peltier cell holder 91-00521 (4) carefully into the sample compartment and guide the cable through the hole in the rear cover.
- Align the cell holder exactly to the 3 guide bolts.
- With the hex driver (3mm) tighten the screw (5).
- Insert the new, white front cover (with vent slots) on the sample compartment from the top.
- Close the sample compartment cover.
- Shift the grommet (6) of the long cable into the slot on the snap cover (1).
- Carefully close the snap cover.

Attention: **Do not squeeze in any cables !**



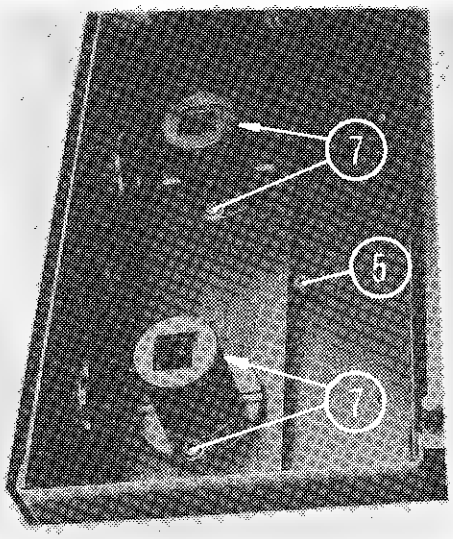




4. ADJUSTMENT OF THE PELTIER DOUBLE BEAM CELL HOLDER

- The Peltier cell holder has been factory adjusted respective to the optical axis.

- If an adjustment should be necessary it can be done by loosening the screw (7) on both sides of the cell holder.



KONTRON INSTRUMENTS

UVIKON 860

Peltier Micro Flow Cell

91-00522

Instructions

TABLE OF CONTENTS

1. UNPACKING AND INSPECTION

Check the delivery for completeness and condition. If anything is missing or damaged inform your KONTRON representative immediatly.

List of delivered items:

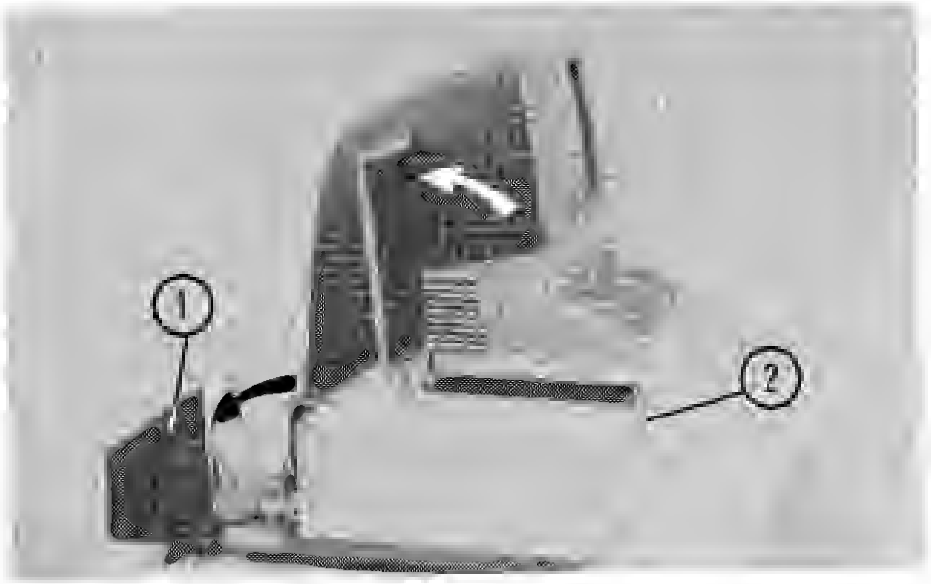
Items	Description	Part No.
1	Peltier Micro Flow Cell	91-00522
1	Hex screw driver 2.5 mm	40-30009
1	Fan compl.	93-00582
4	Screw	22-74010
4	Nut	24-64008
4	Washer	32-61011
4	Spring washer	32-44011
1	Instruction Peltier Micro Flow Cell	84-00237

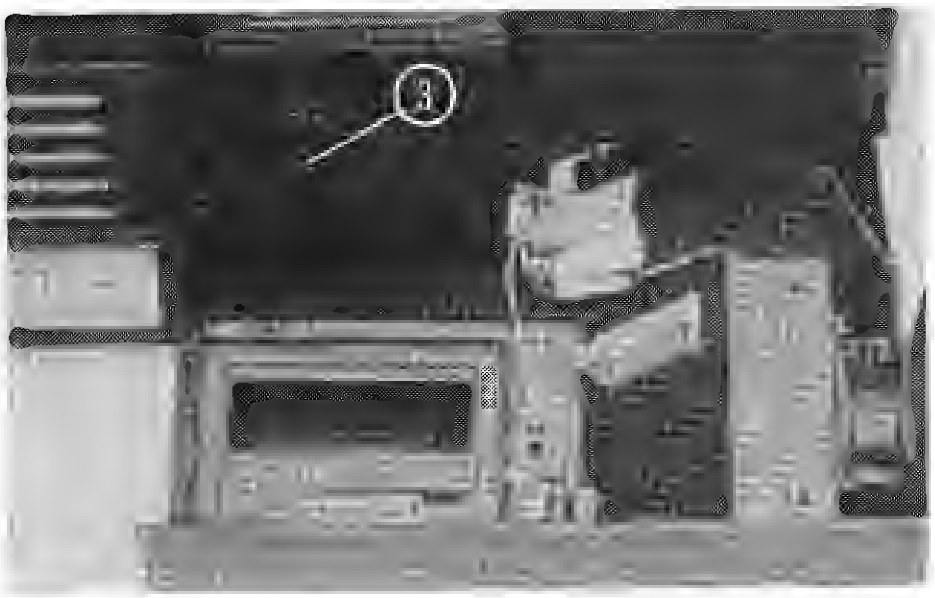
Tools required:

- Hex screw driver with handle 2.5 mm
- Hex screw driver with handle 3 mm

2. PREPARATION OF UVIKON 860

- Switch power off and unplug the mains cord.
- Open the snap cover (1) on the rear side and open the sample compartment cover.
- Remove cell holder or other accessories from the sample compartment.
- Remove the white front panel (2) by pulling it up
- Remove black plug (3), on the rear cover of the sample compartment.

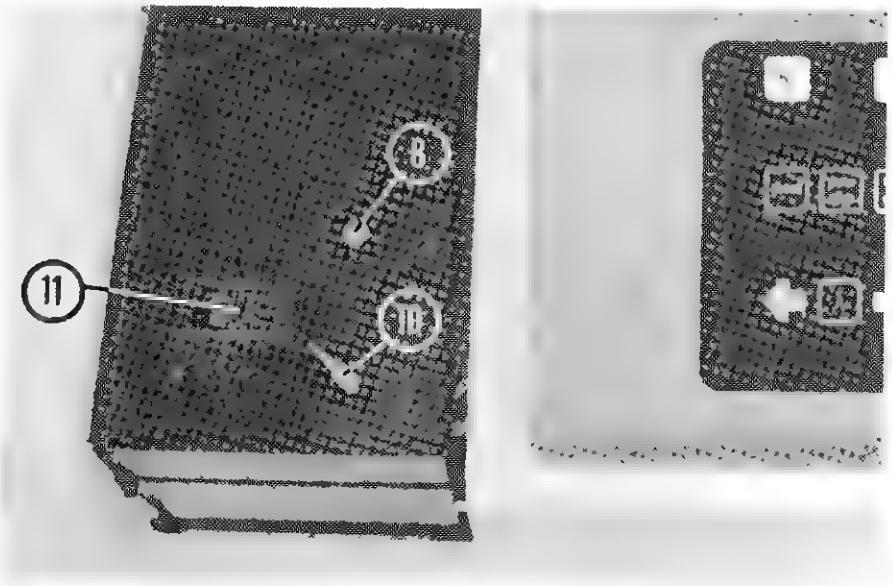


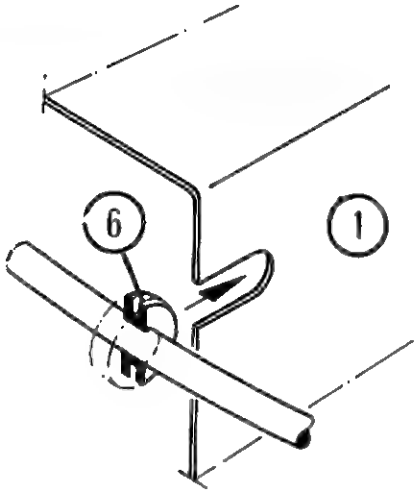


3. INSTALLATION OF THE PELTIER MICRO FLOW CELL

- Insert the Peltier Micro Flow Cell into the sample compartment and tighten it with the screw (8).
- The Peltier Micro Flow Cell has been factory installed for double beam operation.
- Connect the in and outlet tubing (10, 11).
- Insert the new, white front cover (with vent slots) on the sample compartment from the top.
- Close the sample compartment cover.
- Shift the grommet (6) of the long cable into the slot on the snap cover (1).
- Carefully close the snap cover.

Attention: Do not squeeze in any cables !





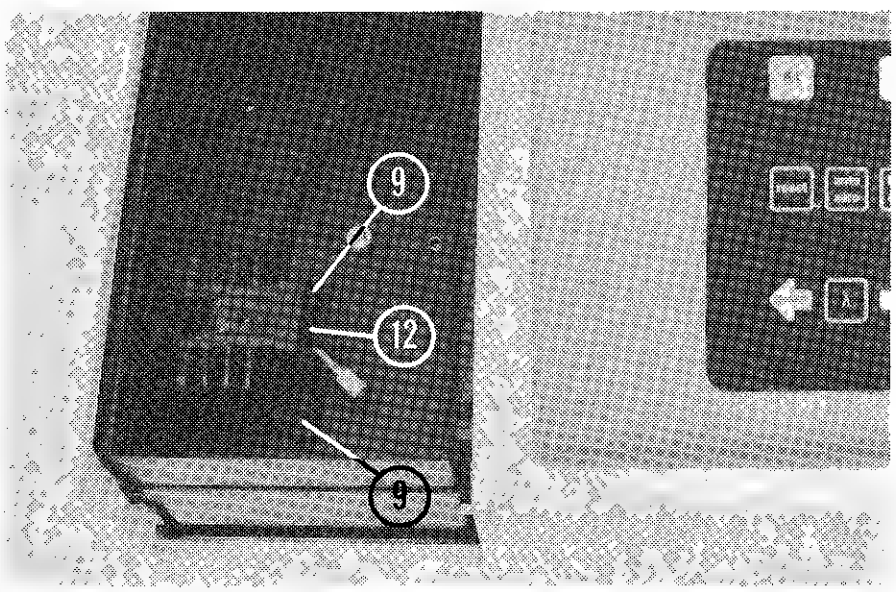
4. ADJUSTMENT OF THE PELTIER MICRO FLOW CELL

- The Peltier Micro Flow Cell has been factory adjusted.

- If an adjustment is necessary:
  . Switch on the power to the instrument (λ = 540nm) loosen screws (9)

- Plug the adjustment guide (12) into the light channel and tighten the screws (9).

- Remove the guide.



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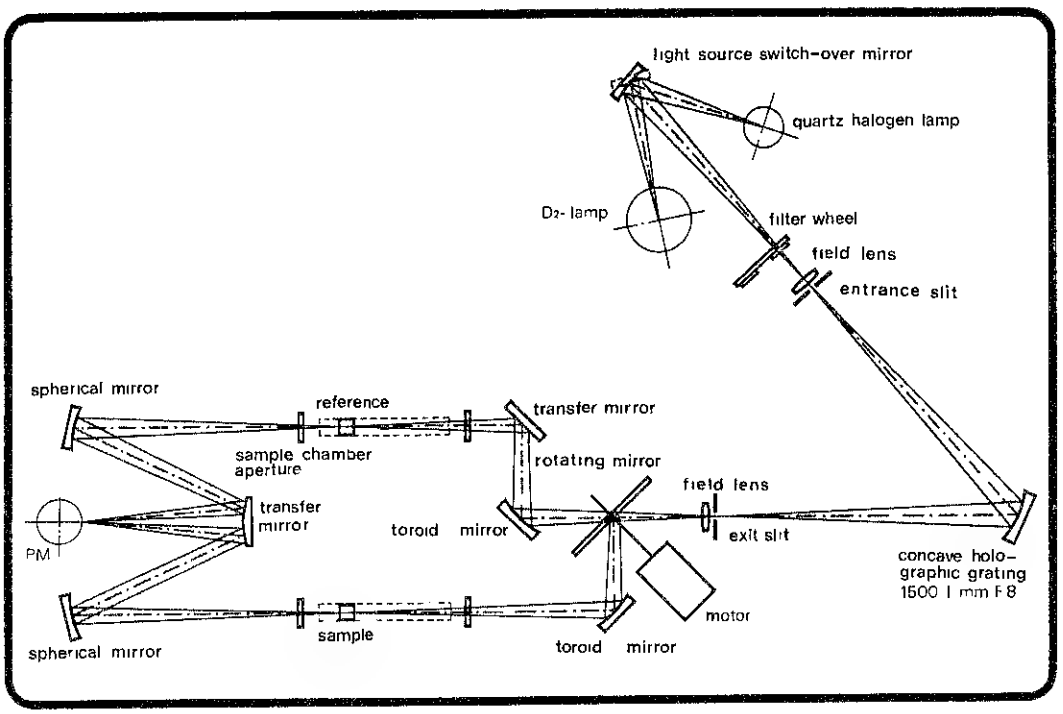
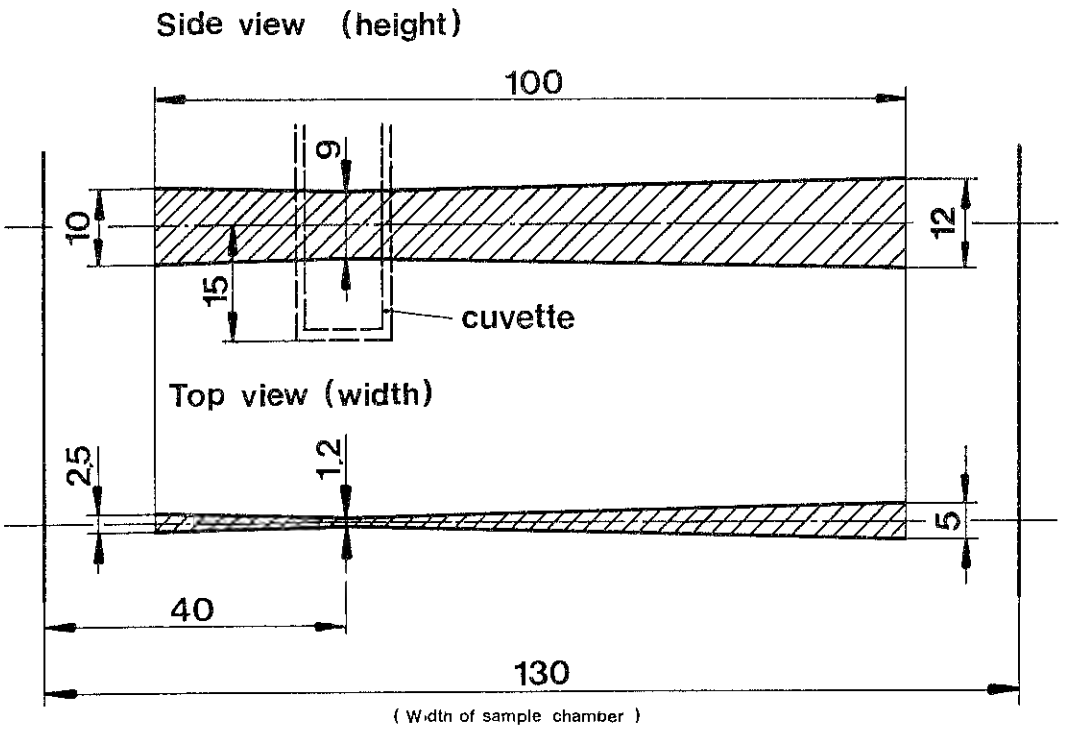
7.1 OPTICS LAYOUT



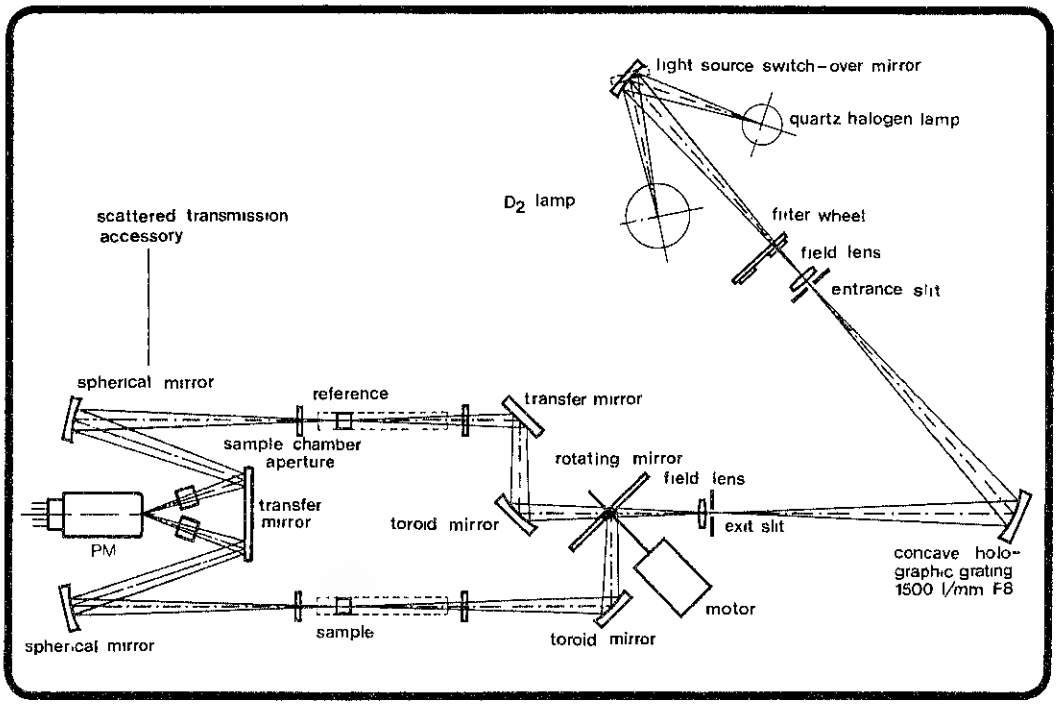
Dimensions of Light Beam, with 2nm Slit



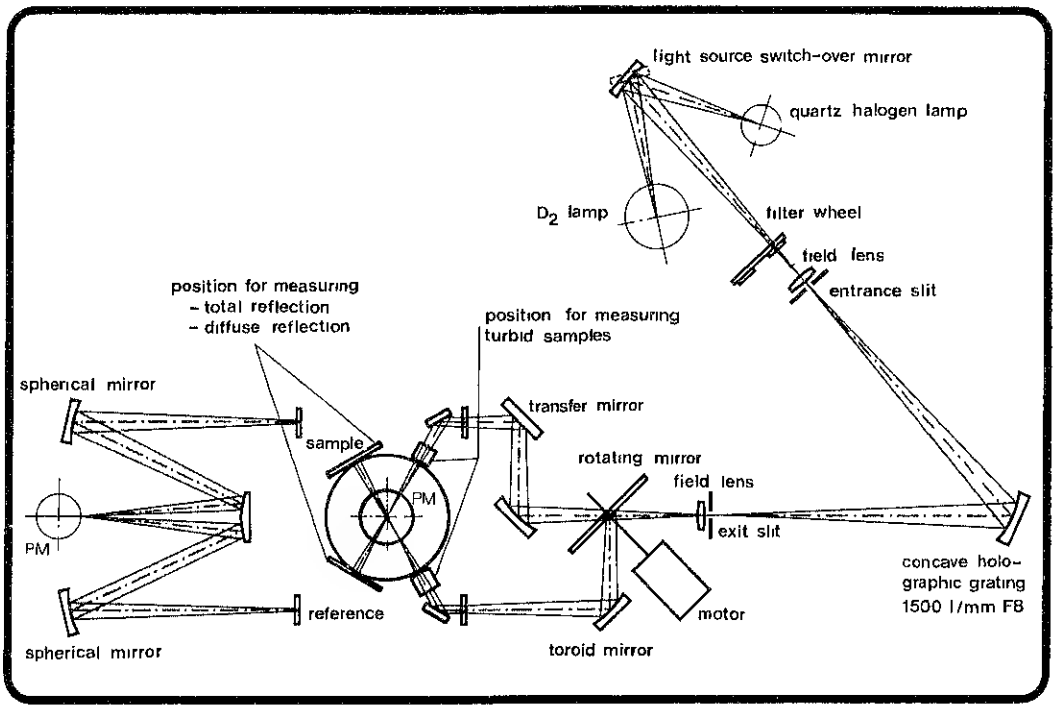
Distance between sample and reference beam is 120 mm.

7.1 OPTICS LAYOUT (cont.)

Optics Layout for the Turbid samples Accessory Order no. 91-00231

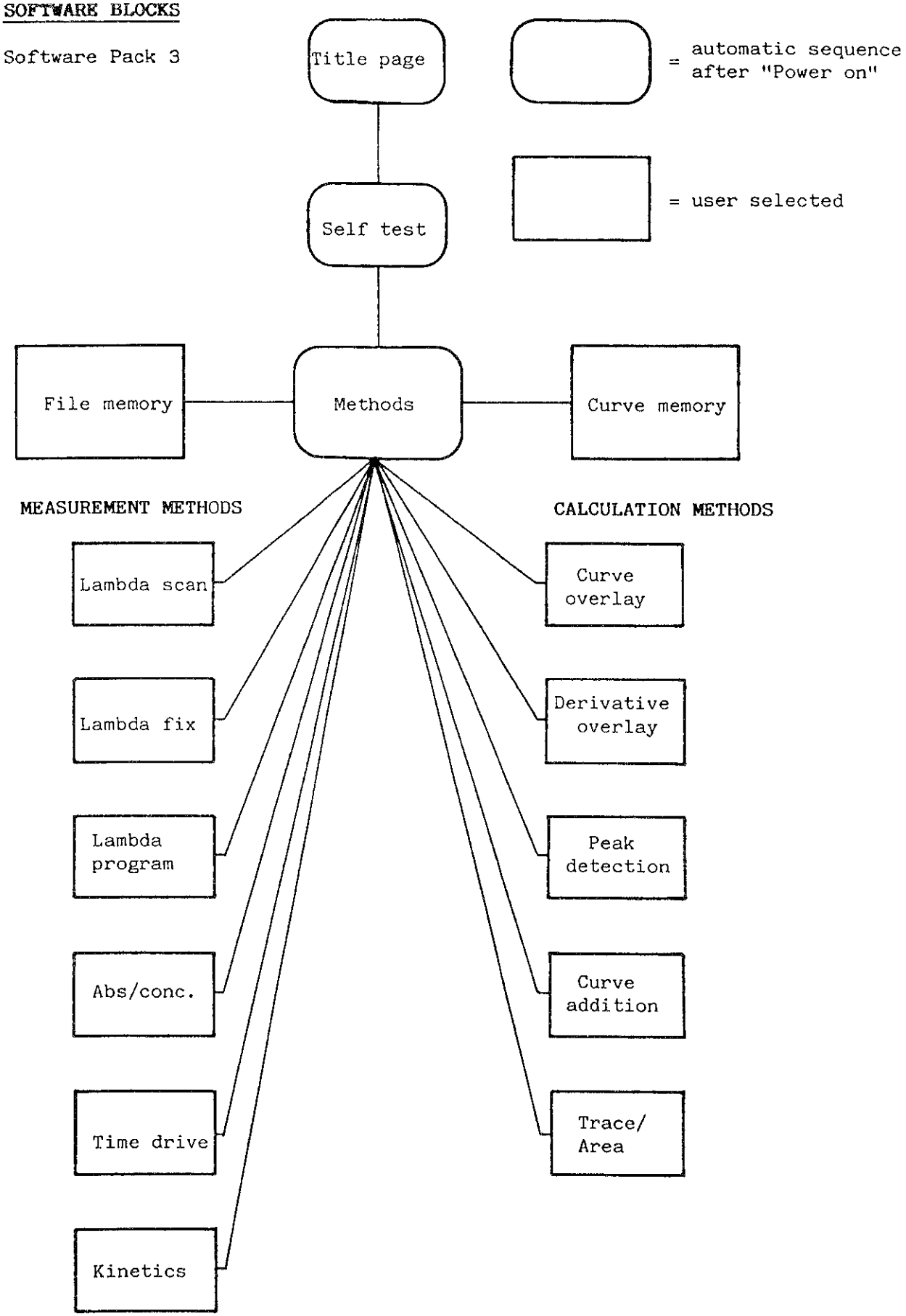


Optics Layout for the Integrating Sphere Order no. 91-00247



7.2 SOFTWARE BLOCKS

Software Pack 3



7.3 KINETIC ANALYSIS

For a kinetic analysis, the course of a chemical raction is measured dynamically during a defined interval of time. From a photometric measurement of the reaction-dependent linear change in absorbance of the sample, the activity can be calculated as follows:

$$\text{Act.} = \Delta A / \Delta X * F = E_2 - E_1 / X_2 - X_1 * F$$

Act.: Activity

A : Change in absorbance of the sample

X : Time interval of the measurement

The determination of the values for the reagent blanks is therefore completely unnecessary, in contrast to an endpoint determination, provided that the absorbance of the reagents remains constant during the course of the reaction.

In order for an activity determination to be as reliable as possible, it is recommended to base the calculation not on two, but on as many experimental points as possible, and to determine the coefficient ($\Delta A / \Delta X$) by a linear regression.

In the UVIKON 860, the number of points can be varied between 3 and 30. For the calculation of the regression coefficient "a" (slope of the regression line) and the coefficient of determination "r^2", the following formulas are used:

$$Qx = \Sigma x^2 - (\Sigma x)^2 / N$$

$$Qy = \Sigma y^2 - (\Sigma y)^2 / N$$

$$Qxy = \Sigma xy - (\Sigma x) * (\Sigma y) / N$$

$$a = Qxy / Qx$$

$$\text{Act.} = a * F$$

$$r^2 = (Qxy)^2 / Qx * Qy$$

Instead of using "r^2" often the abbreviation "CD" (Coefficient of Determination) is used.

7.3 KINETIC ANALYSIS (cont.)

The intercept of the regression line will not be determined. The standard deviation of the regression coefficient, "a", can be determined by:

$$SD_a = \sqrt{Qx * Qy - (Qxy)^2 / (N-2) * (Qx)^2} * F$$

The coefficient of determination, (square of the correlation coefficient) represents a measurement of the relative precision for the prediction of y-values based upon the regression line, but not, however, for the linearity of the measured points. The following guidelines are given for the assessment of r^2:

$r^2 = 1$: Functional relationship between x and y

$0 < r^2 < 1$: Correlation between x and y. The magnitude of r^2 indicates to what extent a change in y is due to a corresponding change in x

In the UVIKON 860, it is possible, even in kinetic measurements, for a blank value to be subtracted, and thereby for possible changes in the absorbance of reagents to be taken into consideration. In this case, the activity is calculated according to the formula:

$$Act. = a - a_b * F$$

a_b = Absorbance difference of the blank (Δ abs/min)

7.4 SIGNAL DIAGRAM